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RETROPUBIC URINARY SURGERY

BY

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TO
MY WIFE

PREFACE

THIS little monograph is really an attempt to accede to the request of a number of Urological friends at home and abroad that I should detail further the methods employed in my Retropubic approach to a number of surgical problems

The generous welcome accorded to earlier presentations and the enthusiasm with which so many surgeons have adopted Retropubic Prostatectomy confirm that my personal long felt dissatisfaction with accepted methods is not unique and has stimulated me to the task of endeavouring to describe more fully the newer techniques which I have found helpful in dealing with the large variety of pathology grouped under the heading of Prostatic Obstruction

I have taken this opportunity of including my hitherto unpublished retropubic operation for Stress Incontinence in Women which actually antedated the use of this approach to the prostate. The number of gynaecologists who have expressed satisfaction with and adopted this operation is I feel a sufficient warranty that the procedure is not without merit though I am deeply conscious that any such operation must stand the test of time. It is but three years since I first adopted the technique

I take this opportunity of thanking those Assistant House Surgeons Ward Sisters and Nurses whose devoted attention kindly encouragement and helpful suggestions have contributed no little to what has already been accomplished

In particular I would place on record my thanks to Mr Ashton Miller F.R.C.S. my Private Assistant for his ever ready help not only in the arduous task of proof reading compilation of statistics and reference-hunting but for his help in writing largely the Chapter on the Anatomy of the Retropubic Spaces skilled assistance in the operating theatre and painstaking after-care of those many patients entrusted to his care. I wish also to thank Messrs L. P. Naz and C. M. Stoker whose valued help in the earlier stages of the work meant so much

Miss Barbara Nicholson has established herself as a worthy pupil of the late Thornton Shiells and has devoted much of her time to the preparation of the illustrations all sketched in the operating theatre. For clarity they are all deliberately made semi-diagrammatic

Lastly, I pay tribute to my secretary, Mrs. Dorothy Leete, for her zeal, never-failing good humour and consummate industry

From my publishers, Messrs Livingstone and especially Mr Charles MacMillan I have received every courtesy and help.

To one and all I tender my grateful thanks.

TERENCE MILLIN

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LONDON, S W 7
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CHAPTER I

INTRODUCTION

THE first twenty five years of this century witnessed a lengthy and wordy battle between the protagonists of the suprapubic and perineal routes. The results obtained by the masters in each approach were in the main good but those generally obtained left much to be desired. The mortality in the suprapubic and the morbidity in the perineal were by no means insignificant and led many a prostatic to procrastinate until irreparable renal damage had been wrought. The development of the transurethral resection procedures in 1931 gave hope to many that the prostatic millennium had arrived but the sanguine prognostications of the early workers can scarcely be said to have been fulfilled. Despite many ingenious improvements in armamentarium the transurethral approach has not secured widespread acceptance for the treatment of most prostatic hypertrophies. The last decade has seen the battle resolve itself into a triangular contest between the protagonists of the three schools—suprapubic, perineal, and transurethral. The standpoint most commonly adopted is that the transurethral approach should be employed in the fibroses and minor hypertrophies whilst the grosser hypertrophies should be dealt with by open operation either suprapubic or perineal according to the operator's preference and competence in each route. It is maintained by many resectionists that it is illogical to advocate a transurethral resection in the lesser enlargements only. If it is the operation of choice in one why not in all? One answer would appear to be that few urological surgeons are competent to secure a complete removal of all the hypertrophic tissue by endoscopic methods in the larger glands in the course of a reasonably short operation. Another is that even in the best hands the period

of urethral convalescence is prolonged when the larger glands are resected transurethrally, complete urinary comfort often not being regained for months. The resection of the massive hypertrophies not infrequently entails a considerable loss of blood, and a large area, coagulated more or less extensively, is left to epithelialise. Infective phenomena, not necessarily in the *immediate* post-operative period, are not uncommon.

The ideal operation must secure a complete removal not only of all existing obstruction, but of all *potentially* obstructing tissue with a minimal mortality, low morbidity, easy convalescence, and rapid return to normal health and urinary function. The operation, moreover, should not be outside the scope of any trained urological surgeon. In this way alone can the greatest good be administered to the greatest number.

In sponsoring yet another approach to prostatic surgery I have few qualms. I have good reason to believe that few surgeons are satisfied with the classical routes, and I know that the retropubic operations I am about to describe are well within the compass of any trained urological surgeon, and indeed are more readily learned than either the transurethral or perineal operations. I have every confidence that the enthusiasm with which earlier presentations have been received will be upheld, and that we can at last offer the prostatic patient a relatively simple relief from his urinary troubles, not in a few clinics staffed by outstanding men, but in a large number of urological services throughout each country. The realisation by the public that a reasonably safe operation with easy convalescence is available, which will enable them to secure permanent relief with quick return to normal activities, should lead to an earlier seeking of advice, with consequent "better risk" type of case, and a corresponding diminution in the surgeon's anxieties. Such is the goal towards which all urologists have been aiming.

It has long been a commonplace in Urological Surgery that contamination of the so-called Cavum Retzii must be avoided at all costs, and generations of surgeons have devised various procedures to avoid any intrusion into this forbidden realm.

In introducing a series of operative procedures deliberately transgressing this territory of ill repute I feel that some justification for so trampling on accepted dicta is required

It is an established fact that many operations on the infected bladder were followed by a pericystitis believed to originate in the retropubic space so to attack organs deliberately via this "dangerous" area would seem at first foolhardy To counter such criticism one must point out that for more than a decade countless surgeons have been carrying out successfully total cysto-prostatectomy in which the retropubic spaces are widely opened up Few of these cases succumb from a spreading infection from the denuded area I believe that the reason lies in the wide exposure of the Cavum Retzi and the consequent free drainage When a septic bladder is opened for drainage some of the contents are apt to escape into the perivesical tissues either at operation or by subsequently seeping into the fat bound retropubic space There is imperfect drainage of this region and the notoriously poor defences of fatty tissue faultily drained come into play The operations described in this volume entail a wide opening up of this space but, in all free drainage is provided. I claim that we have proved that, under these conditions the retropubic space is not vulnerable

The extravesical retropubic approach to the prostate enables us to deal with all pathological conditions met with in the organ and its contained urethra. Adenectomies of all types, resection of median bars curettage of prostatic calculi radical extirpation of the gland, with or without a portion of the bladder base evacuation of prostatic abscesses removal of calculi impacted in the prostatic urethra surgery of certain types of post prostatectomy obstructions, repair of recent and late injuries involving the posterior urethra can be effectively dealt with by this approach

In the female we have shown that by elevation of the bladder neck with an appropriate fascial sling thus correcting the loss of the stretched or torn pubo-cervical fascia we can cure the vast majority of cases of stress incontinence

In short, we hope to make out a case for utilising the retropubic approach to attack many of those urological problems previously dealt with by other more dangerous or more difficult routes, and so bring that hitherto relatively unexplored realm—the retropubic space—more prominently into the urological ken

CHAPTER II

PROSTATIC OBSTRUCTION

UNDER the term prostatic obstruction must be grouped a large variety of pathological conditions. They may be summarised thus —

- a Lateral lobe hypertrophy: $\left\{ \begin{array}{l} \text{unilateral (rare)} \\ \text{bilateral} \end{array} \right.$
- b Posterior commissural hypertrophy
- c Subcervical lobe hypertrophy
- d Subtrigonal lobe hypertrophy
- e Anterior lobe hypertrophy
- f Median bar or sclerosis of the bladder neck
- g Calculosis of the prostate
- h Carcinoma of the prostate.

A combination of two or more of the above is usual and probably the commonest variety of obstruction met with is the trilobed gland in which a bilateral lobe enlargement is associated with posterior commissural hypertrophy.

Whilst the adenomatous or hypertrophic type of gland is readily differentiated from the fibrous, calculous or carcinomatous glands in most cases the exact diagnosis frequently rests with the cysto-urethroscope e.g. Fig. 1.

Having established that surgical intervention is indicated and that the patient has been brought into the best possible condition to withstand this intervention, modern urological surgery now demands that the precise nature of the obstruction be determined so that the eradication not only of all apparent obstruction is effected but also the removal of all potentially obstructing tissue. Disregarding for the moment incomplete transurethral operations, it is well known that the suprapubic transvesical operations are not infrequently culprits in allowing small residuary nodules to be left close to the apex of the

gland, whilst even the best conducted perineal prostatectomies are not immune from leaving, inadvertently, sub-cervical or sub-trigonal adenomata placed no less strategically in close proximity to the bladder neck. A careful cysto-urethroscopic



FIG 1

Enormous hypertrophy of verumontanum leading to difficult urination

examination should enable a full diagnosis of the precise nature of the obstruction to be made, and the operation planned accordingly. The retropubic exposure, with its excellent visualisation of the whole of the prostatic cavity, is an additional safeguard against leaving behind such potential sources of obstruction.

The following is a brief description of certain features, clinical and endoscopic, in the commonest types of obstruction.

Bilateral lobe hypertrophy (Fig 2)—This extravescical type of enlargement, without intravesical projection, reveals its true size on rectal examination, and on occasion can reach truly enormous proportions, defying all efforts of the rectal

examining finger to reach its topmost limits. Clinically the most prominent features are usually frequency and extreme



FIG. 2

Moderate bilateral lobe hypertrophy. (In this specimen partial enucleation of each lateral lobe has been performed as would be done during a prostatectomy.) One notes the trabeculated bladder wall and the relatively undisturbed trigone. The enucleation has left a smooth cavity with verumontanum spared. (Randall)

urgency. Difficulty may not be a prominent feature even in the case of the largest glands. Attacks of acute retention are

not infrequently relieved by the passage of a catheter on a single occasion. Factors leading to prostatic congestion, e.g., alcohol, sexual excess, exposure to cold and damp, failure to obey the urge of urination when it occurs, may lead to an intracapsular engorgement with consequent enlargement of the adenomatous lobes and blocking of the urinary outflow



FIG 3

Inverted V effect at roof of vesical neck

The passage of the catheter and emptying of the bladder will decongest the gland, and relatively normal micturition may be resumed, months or even years may elapse before a further retention supervenes. Endoscopic examination will reveal an increase in the length of the urethral canal, some gripping in the passage through the prostatic urethra, and in certain instances where the growth of the lateral lobes is irregular, e.g., one being more developed in the distal portion and the other proximally, some rotation of the beak of the endoscope may be required for easy introduction. The residual urine is usually minimal or absent. Gross vesical hypertrophy

evidenced by massive trabeculation is commonly seen. Owing to the absence of intravesical protrusion no *bas fond* is present and the whole of the trigone is easily apparent. With the optical system directed anteriorly a deep cleft is seen (the inverted V effect) at the bladder neck which is continued along the length of the prostatic urethra (Fig 3). Looking posteriorly at the bladder neck there is a slight



FIG 4

Cystoscopic appearance of coarse trabeculation of bladder associated with prostatic obstruction. Compare this with the fine type of trabeculation characteristically seen in the bladder dysfunctions of neuropathies (Fig 5)

elevation which rapidly merges into a deep cleft as the instrument is withdrawn. The withdrawal must be continued not only until the verumontanum is seen but until the distal extremities of the lateral lobes have been visualised. Careful search will be made for evidence of small sub-cervical or sub-trigonal lobules lest these be missed at operation.

Posterior Commissural Hypertrophy—Whilst there is no

characteristic symptomatology in any type of prostatic obstruction, this variety usually shows increased frequency, delay in initiating the act, and diminished stream. On rectal examination there is seldom marked enlargement, though on bimanual palpation in a thin subject enlargement may be detected in



FIG. 5

Vault of Tabetic Bladder showing characteristic fine type of trabeculation

the grosser varieties. Unnatural thickening of the posterior lip of the vesical outlet may be felt when rectal examination is made with a catheter or cystoscope in the urethra.

Endoscopy will reveal at times some difficulty in negotiating the bladder neck. Residual urine will be marked in the more extreme varieties, as will trabeculation of the bladder wall. Even in the grosser types no difficulty will be found in securing a view of the trigone, unlike the situation when dealing with that other type of "middle lobe"—the *sub-cervical variety*. On withdrawing the endoscope over the floor of the thickened bladder neck, the depth of the hypertrophic tissue will be determined, and in the larger glands deep clefts or sulci will be seen laterally.

Bilateral and Posterior Commissural Hypertrophy—This combination of the two foregoing types is that presenting to the suprapubic prostatectomist as the intravesical horse



FIG 8

Posterior commissural hypertrophy. Note here the heavy acule lobe in the midline obscuring the trigone and bladder base spreading out laterally to right and left but not involving the lateral lobes in similar hypertrophy. The mouths of two diverti cula may be seen (Hendall)

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FIG 6

Posterior commissural hypertrophy. Note here the heavy sessile lobe in the midline obscuring the trigone and bladder base spreading out laterally to right and left but not involving the lateral lobes in similar hypertrophy. The mouths of two diverticula may be seen (Randall)

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seldom regained until prostatectomy or resection has removed the obstruction. Catheterisation in this type may not be easy, and a bicoudé curve or hollow-tipped rubber catheter, armed with appropriately curved stilet, may be required to traverse the prostatic urethra.



FIG 7

Cystoscopic appearance of floor of bladder neck
in posterior commissural hypertrophy

Endoscopy will show elongation of the urethra, elevation at the floor of the vesical outlet (Fig 8), marked anterior V, and deep clefting in the urethra. Posterior urethroscopy in these cases is very important to differentiate the posterior commissural hypertrophy from the subcervical gland enlargements. In this form of trilobed enlargement of the prostate the tissue enucleated should represent a single mass.

Solitary Sub-cervical Hypertrophy (Fig 10) — This type always enlarges intravesically, herniating through the internal sphincter. Rectal examination reveals no prostatic enlarge-



FIG. 8

Moderate bilateral lobe and posterior commissural hypertrophy. Both lateral lobes are hypertrophic the left slightly larger than the right there is a deeply clefted posterior commissural hypertrophy. The three masses are intimately connected. Most of the trigone is obscured
(Randall)

present anteriorly, with similar cleft formation at 4 and 8 o'clock at the vesical outlet

Sub-trigonal Lobe Hypertrophy.—This type is seldom of practical importance unless associated with hypertrophy of other lobes. In one instance only, detailed later in the text, did we find an example of solitary sub-trigonal enlargement necessitating intervention

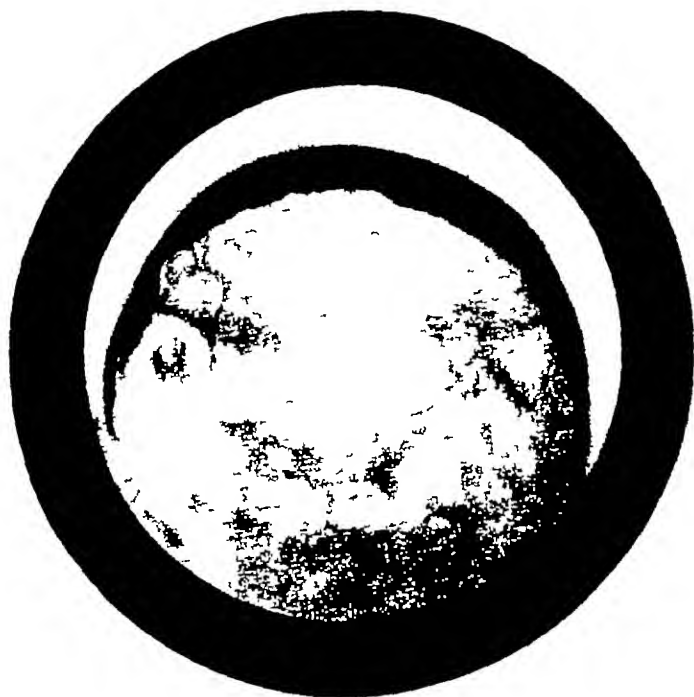


FIG 11

Cysto-urethroscopic appearance of sub-cervical lobe

Anterior Lobe Hypertrophy.—This is another rare type of hypertrophy owing to the infrequency with which glandular elements persist in the anterior commissure in adult life. We have met with but two examples, and each was relieved of an acute retention by means of a transurethral resection

Median Bar (Figs 14 and 15) —This term was first introduced and described by Guthrie in 1834. Writing of this condition Randall says "such a bar is an obstruction to the vesical outlet from a thin and abrupt elevation of the posterior vesical lip rising to distort the normally smooth vesico-urethral

outlet and associated with a markedly contracted and sclerotic internal vesical sphincter. This is the true median fibrous bar that has travelled the world over under various other descriptive terms and clinical titles such as contracture of



FIG. 12

Filling defect in cystogram caused by large intravesical sub-cervical lobe

the vesical neck, sclerosis of the internal sphincter, atrophy of the prostate, prostatisme sans prostate, etc. etc. Randall came to the conclusion that all such median bars were the result of an antecedent inflammatory process resulting in effect from an underlying chronic prostatitis.

The clinical picture does not differ from other forms of prostatic obstruction except that it tends to present itself at an earlier age, dysuria and residual urine being present in the absence of demonstrable prostatic hypertrophy, either on rectal examination or endoscopically.

Of the gross pathology Randall writes: "On laying open

the bladder in such a case, with its attached prostate and posterior urethra, along the ventral surface, one immediately



FIG 13

Bilateral and sub-cervical lobe hypertrophy. Note the pedunculated sub-cervical lobe, the clefting being particularly marked on the left. Both lateral lobes are enlarged. Moderate trabeculation of the bladder. (Randall)

appreciates the obstruction to both urination and instrumentation by noting the abrupt elevation of the posterior vesical lip. On the bladder aspect the trigone is found to descend

from the bar's edge in an abrupt fall which in the living tends to make the trigonal plane approach the horizontal



FIG. 14

Typical fibrous median bar formation. Not thin walled atrophic and non trabeculated bladder. The mouth of a diverticulum is seen in the vertex. The posterior lip of the vesical outlet marks an abrupt dam between a deep bas fond and the floor of the prostatic urethra. There is no hypertrophic change in the prostate. The posterior urethra is narrowed and deepened by the fibrous changes. (Hansell)

and have much the same effect as a marked cystocele in the female bladder though in the male with a bar formation this

change is due to the sclerotic contracture and elevation of the bladder's orifice, rather than the falling away of the trigonal support as in a cystocœle"



FIG. 15

Fibrous median bar. Here again the posterior vesical lip shows the typical fibrous median bar formation. Note the narrowed vesical outlet, the abrupt decline to the prostatic urethral floor, the contracture drawing the verumontanum under the breast of the bar. In this case there is no narrowing of the urethra (cf Fig. 14) (Randall)

He continues. "In viewing the posterior urethral aspect one is struck by two outstanding changes. The first is the change in the normal course of the urethral floor at the approach to the vesical orifice. here, where in the normal, one finds a slight elevation formed by the soft tissues of the vesical

uvula, is observed in the bar cases an abrupt end to the urethral course and a definite bar or dam, lies across the approach to the vesical cavity producing a right-angled change in the course of the urethral lumen. The vesical orifice or posterior vesical lip may lie 1 or 2 cm above the actual floor and level of the posterior urethra. The tissue forming this bar is no longer the soft uvular tissue but a firm dense inelastic mass that may be 0.5 to 1 cm in actual thickness. The second outstanding change is one of especial interest both from the part it plays in explaining the pathologic process that has occasioned the bar and from its value in aiding the diagnosis at cystoscopy. This change is the finding of the verumontanum drawn up to a point directly under the breast of the bar formation—a picture so characteristic of sclerotic contracture that it forms the one pathognomonic feature of bar formation and attention to this fact was one of the important findings from our early studies and was first recorded in that work.

If one bisects such a bar formation in the median line posteriorly the cut surface appears as fibrous tissue with a minimal amount of muscular tissue but no glandular tissue is visible at all—again presenting the evidence of inflammatory sclerosis. The posterior commissural glandular tissue when present lies far down under the base of the bar and unchanged in character or position from the normal.

The cystoscopic examination in these cases becomes an essential factor in diagnosis for without it a true interpretation of the cause of the symptoms and an explanation for the presence of the residual urine could be nothing better than guess work or surmise. The bladder is found to show evidences of obstruction in its trabeculation, basal formation and hypertrophic trigonal muscle. Diverticulation of the bladder has been a frequent accompanying lesion to be mentioned more particularly further on.

Cystoscopic study of the vesical orifice shows an absence of the characteristic clefting of prostatic hypertrophy and one finds a smooth anterior sphincter rim but should note

the characteristic precipitate declivity of the trigonal plane when looking posteriorly. As one withdraws the instrument outward over the posterior vesical lip to examine the prostatic urethra, the cystoscopic entrance to the posterior urethra is accomplished by visually falling down a declivity to a sudden stop at its base and the finding of the verumontanum on the floor of the urethra at this point, a pathognomonic picture,



FIG 16

Skiagram of Calculous Prostate

which when combined with the symptoms of prostatism and the finding of residual urine forms the clinical triad on which the diagnosis stands

"A second type of fibrous bar formation has been observed that differs slightly in its gross pathology from the characteristic one just described. In it the sclerosing process seems to have expended its influence on the trigonal side, more than on the urethral aspect, and one finds on cystoscopy a shortening of the trigone, oft-times with a transverse creasing of the

same and a close approximation of the interureteric ridge to the vesical orifice. In this latter type there may be no foreshortening of the urethral floor or change in the position of the verumontanum

Calculus Prostatitis—By this we mean the true or endogenous prostatic calculi in contradistinction to those urinary calculi lodged in the prostatic urethra or in communi

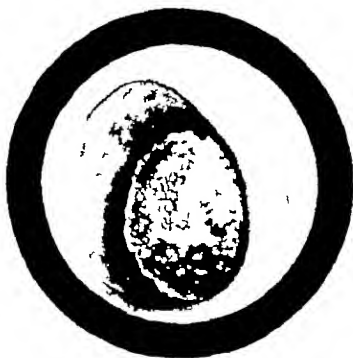


FIG 17

Urethroscopic view of prostatic calculus impinging on urethra

cating diverticula therefrom. There is invariably a chronic inflammatory condition of the gland. Rectal examination will disclose a firm induration of the prostate with obvious crepitus in some cases. Where suspicion of a calculous prostatitis exists radiological studies should be made. Fig 16 depicts the typical X ray appearance of extensive calculous disease of the prostate.

Endoscopically there may be little confirmatory evidence though not infrequently a grating may be detected on the passage of the instrument through the affected portion of

the canal, and in some instances one or more calculi may have ulcerated through the mucous membrane and be seen projecting into the prostatic urethra. Such calculi may lead to hæmaturia, or even cause a retention Fig. 17 shows the endoscopic appearance of such a complication

Carcinoma of the Prostate.—There is no characteristic symptomatology of the malignant prostate. A short history of prostatism with rapidly developing symptoms is strongly suggestive of malignancy, but a number of these cases are slowly progressive over several years. Clinically there are two main types:—

- a. The **small hard gland** which is prone to metastasise to bone early.
- b. The **large diffuse nodular type** which metastasises late, and tends to lead to a uræmic death by compression of the ureters—the aptly named “*frozen pelvis*.”

It is the latter type which appears to respond best to oestrogen therapy. Many cases present such characteristic classical signs on rectal palpation as to render diagnosis certain, but there are other cases where a presumptive diagnosis only may be given. Where any doubt exists, radiological examination of the pelvis and lumbar spine should be made (a) to rule out calculous disease, and (b) to exclude bony metastases. Endoscopy in the malignant prostate is not always easy, and indeed in the large type of gland may be contraindicated. A lack of mobility and “gripping” of the endoscope in the prostatic urethra is very suggestive of malignancy. Bullous oedema of the bladder neck or of the trigone, where extension has occurred, may be noted.

DIAGNOSIS

The **diagnosis of prostatic obstruction** can usually be readily made from the history and the clinical examination. Rarely however, doubt will exist as to whether a case is one of true prostatic obstruction or merely an infective or conges-

tive prostatitis. Where such doubt exists careful cysto-urethroscopic examination will settle the issue.

Though the diagnosis in most cases is easy, very great judgment is requisite in determining the advisability of operative intervention. I have never held with those enthusiastic resectionists who advocate a prophylactic resection for the earliest evidence of prostatism. In my judgment, very positive evidence of established obstruction must be present; there must be good reason to believe that such obstruction if left untreated will lead to a shortening of the life of the particular patient (I have seen many cases where operative intervention has been advised or even carried out disastrously in men harbouring other lesions likely to prove fatal before increasing prostatism would either end their days or render them intolerable). Prostatic hypertrophies vary exceedingly in their rate of growth, and indeed mere size is not an indication for surgery. The surgical attack on the obstructing prostate, whether it be by transurethral approach or by any one of the many open operations, remains an adventure of real magnitude for the patient. A very heavy onus is laid on him who counsels such a hazard.

Residual urine is held in many quarters to be of paramount importance. With this view I cannot, in general, concur. The old teaching that operation should be advised only if the residuum is in excess of 120 c.cs. should be relegated to the limbo of the past. Many a patient is suffering from extreme effects of obstructive uropathy with gross vesical trabeculation, dilated upper urinary tract, elevated blood nitrogen, etc., but yet has a negligible residual urine. On the other side of the picture I have a patient under my care whom I first saw at the age of 76, giving a history of marked urinary obstruction for more than 40 years. For this period it had been his custom to adjourn to the lavatory twice daily and spend a full half hour forcing out dribblets of urine whilst reading a detective story! On examination the belly was grossly protuberant, the bladder reaching to the xiphisternum and containing at a conservative estimate 5000 c.cs. of

residuum There was no prostatic abnormality detectable to the rectal examining finger The urine was uninfected and the Blood Urea estimation was 26 mgms per cent I have little doubt that this was a case of median bar obstruction, but I held it dangerous to advise any intervention, and now three years later the patient is still in excellent health despite his long-standing urinary obstruction

The two types of prostatism most commonly missed are (a) those presenting dyspeptic symptoms or anorexia, lassitude and inability to concentrate, without marked urinary symptoms, who are in reality sub-uræmic and (b) those presenting recurrent attacks of urinary infection The former, due to faulty physical examination, are not discovered to have a chronically distended bladder with renal back-pressure effects, and the latter are usually labelled chronic cystitis Both require complete urological investigation and will usually require surgical attention

The symptom of hæmaturia will invariably call for thorough investigation even where obvious prostatism exists One is not justified in assuming that bleeding comes from an engorged hypertrophic prostate, if such exists, until every avenue has been explored to rule out vesical, ureteric and renal sources In one personal case after all such investigations had proved negative, I removed a large adenomatous prostate only to find some months later, as the hæmaturia continued, a small papilloma emerging from a vesical cellule Previous cystoscopic examinations both by myself and a colleague had failed to visualise it In another case arriving in hospital with acute retention and a history of hæmaturia, all investigations failed to reveal any source of the bleeding other than the prostate A successful prostatectomy was followed some months later by recurrence of the hæmaturia The bleeding was then tracked down to the left kidney which was harbouring a small hypernephroma



FIG 18

Angioma of prostatic urethra causing hematuria and diminished urinary stream



FIG 19

Primary Carcinoma of Prostatic Urethra.

Figs 18 and 19 illustrate two rare types of case presenting typical prostatic symptomatology, urinary frequency, diminished stream with occasional hæmaturia. Neither revealed any demonstrable abnormality on rectal examination but endoscopy established the rare diagnosis. The angioma of the prostatic urethra was present in a young man of 42 and responded to urethroscopic diathermic coagulation.

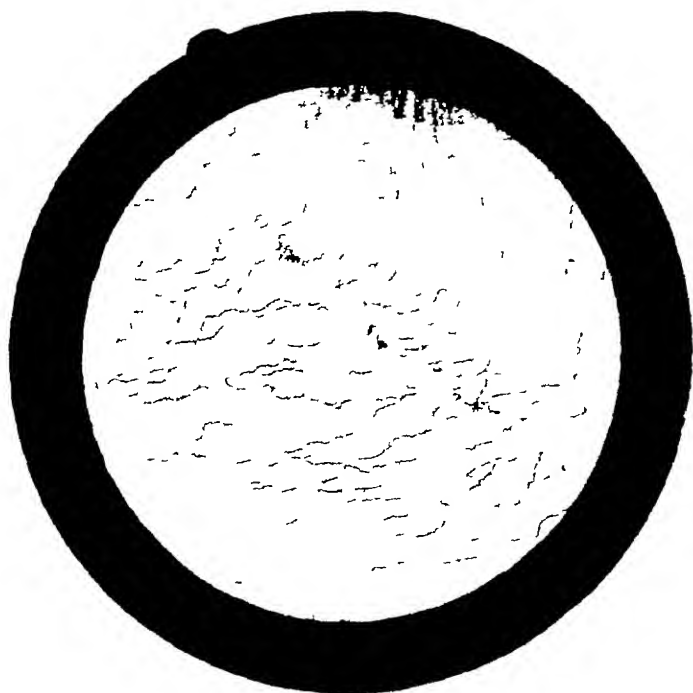


FIG 20

Varicose veins in bladder

The carcinoma of the posterior urethra was in a man of 67 seen some years ago and deemed to be inoperable. A suprapubic cystostomy was performed.

Hæmaturia may on occasion be due to marked varicosities in the bladder, as seen in Fig 20. In such a case in a young man of 27 I injected endoscopically the varicose vein with sodium morrhuate, and cystoscopy five years later revealed no trace of the enlarged vessel.

An increasing number of patients present themselves because of urinary frequency and periodic difficulty who show a soft moderate enlargement of the prostate on rectal exam-

CHAPTER III

SURGICAL APPROACHES TO THE PROSTATE

HE who embarks on the surgery of the obstructing prostate must be equipped to deal with all types of case and will find that no single operation will prove adequate for the variety of pathology met with.

The commonly accepted methods of attack on these obstructions may be thus summarised:—

- a. Transvesical suprapubic.
- b. Perineal.
- c. Transurethral.

Whilst individual surgeons claim that by one or other of these routes they can tackle successfully all pathological conditions encountered, most agree that, to date, no single route is satisfactory for all, and so they endeavour to familiarise themselves with all three approaches, a personal preference, in the nature of things, for one or other route predominating. Most British and Continental urologists prefer the transvesical operations associated with the names of Freyer, Thomson-Walker, Marion and Harris, exceptions favouring the perineal or transurethral routes. In America, Young and his many able disciples have long advanced the claims of the perineal approach in the majority of cases, reserving the transurethral route for the fibroses and minor hypertrophies. The schools of the Middle West typified by the Clinics at Rochester, Ann Arbor and Iowa City have utilised the transurethral route almost exclusively in recent years.

Prior to August 1945, my own practice latterly was to employ a transurethral resection in approximately 60 per cent. of cases excluding the grossest hypertrophies and the extensive calculous prostates. For the former I adopted the supra-

London with probably the largest experience of prostatic surgery in Great Britain in recent years and for long a devoted adherent to the two-stage Frever technique was an early convert to my retropubic operation

Harris Operation—Most urological surgeons regard this as a more formidable procedure than the Frever and tend to reserve it for the better risk cases. It has been well said that when a Harris operation goes well it is exceedingly good and when it goes wrong it goes terribly wrong rather like the little girl in the nursery rhyme. The procedure has undoubtedly lost popularity during recent years. Most American and Continental urologists have steadfastly set their faces against the operation on the grounds that the prostatic bed is no place for plastic suturing. It has had some following in Great Britain notably by Morson and Riches in London and Galbraith in Glasgow. Quite recently a prominent surgeon from Melbourne Australia told me that the first Harris prostatectomy he ever witnessed was during his recent visit to London. It would appear that the procedure has been largely given up in the land of its birth though seemingly it still has its followers in Sydney.

Perineal Prostatectomy—This operation in its modern form^{1,2} has much to commend it. It carries a lower mortality than the suprapubic but the not infrequent unpleasant or even disastrous sequelæ in the form of persistent or slow healing fistulæ incontinence of varying degree urethro-rectal fistulæ, etc. have led the procedure into disrepute in many quarters. Moreover the operation is not easy to perform and skill is acquired only after a lengthy apprenticeship. Technical difficulties often present themselves. The depth from the surface in the very stout subject renders adequate visualisation difficult and the exaggerated lithotomy position commonly adopted throws a strain on the ligaments of many an elderly spine to say nothing of arterio-sclerotic vessels. (I have heard of one ruptured iliac artery

1 Davis *Fowler* (1942) *J. Urol.* 48, 163 and (1940) *J. I. M. I.* 115, 582
Belt *Elmer* (1939) *J. Urol.* 41, 489

operator only rarely called on to deal with prostatic obstructions. Little special training is required for its execution, the main prerequisites demanded being judgment as to its indications and contra-indications, with some skill in the after-care. It lends itself well to the extirpation of all hypertrophies but presents great difficulties in the fibrotic and calculous glands, by this approach radical extirpation of the malignant gland is impossible. The two-stage method of carrying out the operation is that most frequently adopted but it entails a lengthy hospitalisation, averaging 6-7 weeks, the blood loss both at operation and during the first two or three days is considerable, the post-operative course cannot be described as other than unpleasant and bladder spasms during the first 24 hours can try the courage of the bravest¹. Secondary hæmorrhages are by no means infrequent, septic phenomena common and nursing duties arduous. The period of convalescence after leaving hospital is usually prolonged and the operation in the eyes of the laity and indeed also of the medical profession has acquired a deservedly unsavoury reputation. The mortality rate remains about 8-10 per cent, if one includes, as one must, those dying after the initial cystostomy. The end-results, too, are not always satisfactory. Riches and Muir² in a follow-up of 55 cases traced out of 99 subjected to a suprapubic prostatectomy for adenomatous or fibroadenomatous glands found only 44 (i.e., 85.5 per cent) conformed to their criteria of a satisfactory result, namely a free urinary stream and nocturia of two or less. It is most likely too that many of those who did not answer the questionnaire were unsuccessful cases and so the proportion of gratifying results correspondingly lower. From such figures and indeed one's own personal experiences, the Freyer operation and its various modifications leaves much to be desired. It is noteworthy that the late Mr Sydney MacDonald of

1 On this point one cannot refrain from quoting the case of the internationally celebrated Urologist who taught for many years that pain after a properly conducted Freyer enucleation was minimal, his views on the subject changed materially after his own prostate had been removed, by such a procedure, by one of his disciples.

2 Riches, J. W., Muir, F. G. (1933) *Brit. J. Surg.* 20, 366.

exponents the operation has a low immediate mortality but the period of urethral convalescence is apt to be slow and complete urinary comfort may be delayed for many weeks and in some cases not secured at all or only after a further resection. The high incidence of post-operative stricture has not, in my opinion been sufficiently stressed. It is inconceivable that the commonly employed Resectoscopes gauged 30F (one popular cold punch euphemistically calibrated by the makers 30F is nearer 33F) can be passed with safety along the majority of male urethræ. The fact that Reed Nesbit of Ann Arbor a leading protagonist now admits to employing an external urethrotomy in some 33 per cent. of his resection cases speaks volumes on this subject. I have seen many cases of appallingly strictured urethræ following transurethral resection. It has long been my practice never to exceed a No 28F instrument and in most cases to employ a No 25F resectoscope when dealing with the fibroses and minor hypertrophies.

To sum up none of the above mentioned classical approaches would appear to conform with the criteria of the ideal operation. With such experiences we felt supreme dissatisfaction with accepted methods and sought improvement in results with the retropubic approach.

from the adoption of an exaggerated lithotomy position) I have it on good authority from one of the leading American Clinics where perineal prostatectomies are performed almost routinely that a not inconsiderable number of patients complain of their backs for months after a perineal prostatectomy Post-operative stricture is relatively frequent and Lowsley,¹ a foremost exponent, wrote recently (1944) in this connection "the post-prostatectomy patient should be under the care of his surgeon for an indefinite period Frequent dilatation with sounds or Kollmann dilator, to prevent stricture at the vesical orifice, should be done" Such post-operative care may offer almost insuperable difficulties to the patient living far from the clinic The sexual sequelæ of this operation, too, are not without significance The frequency with which sexual impotence follows a perineal prostatectomy is well-known, and many patients to-day seek information as to subsequent sexual potentialities before agreeing to intervention on their obstructing prostate

Transurethral Resection.—This operation, as mentioned earlier, finds its main advocates in the Middle West of America^{2,3} That it has proved a valuable addition to Urological Surgery few will deny but, in the hands of most urologists, it does appear to have its limitations It is an exceedingly difficult operation to master sufficiently to give good and lasting results in the grosser hypertrophies Few, if any, are capable of resecting in its entirety the whole of the hypertrophic tissue⁴ If adenomatous tissue is left behind it will probably prove a source of trouble either from continued sloughing due to imperfect blood supply (Flocks, 1937)⁵ or from a continuance of the growth process leading to recurrent obstruction in later years In the hands of a few leading

1 LOWSLEY, O S, KIRWIN, T J (1944) 'Clinical Urology'

2 NESBIT, REED (1943) "Transurethral Prostatectomy"

3 BARNES, ROGER (1943) 'Endoscopic Prostatic Surgery'

4 I have personally removed by suprapubic operation some 75 grams of prostatic tissue from a patient resected in a leading Middle West transurethral clinic some few months earlier I have heard of several similar cases from American Urological friends The total transurethral prostatectomies claimed by many resection enthusiasts fall far short of complete removal of hypertrophic tissue It appears to me high time that this was recognised

5 FLOCKS, R H (1937) *J Urol*, 37, 524

abdominal wound was closed the gauze emerging from the lower end. Blood oozed from the bladder and from the drain for some hours and then stopped. The pack was removed in 24 hours a small gauze strip being introduced instead. On the fifth day the gauze drain and the vesical tube were removed and a urethral catheter inserted. On the twelfth day the catheter was taken out the wound was healed and normal urination occurred.

van Stockum went on to say that he believed that the operation was more rational than the Freyer and did less damage. He said it should of course be possible to dispense with the tube in the bladder and use only a urethral catheter. He believed that the catheter would not get blocked with blood clot because the blood would not escape into the bladder. There is no record of his having utilised, or at any rate of having reported this technique, nor have I been able to find any subsequent publications of his on the subject.

In 1924 Otto Maier of Innsbruck¹ reported a series of four cases in which he attacked the gland by an inguinal extra-vesical route. It seems curious that he should have chosen to approach a medially sited organ by a laterally disposed incision when the mid line approach is more direct and transgresses no important structures. He laid down the following conditions for a satisfactory prostatectomy —

- 1 Approach by the shortest route.
- 2 Avoidance of damage to the bladder
- 3 Avoidance of damage to neighbouring structures, e g., rectum, ureter, vesicles, etc.
- 4 Rapid return to normal micturition
- 5 Avoidance of fistulae

The operation he described entailed an inguinal incision as for herniorrhaphy. The deep epigastric artery and veins were divided. The peritoneum was pushed upwards and inwards so exposing the lateral aspect of bladder and prostate. The prostatic plexus was then picked up between two Kocher's forceps and divided. (Thus he naively stated was

¹ MAIER O (1924) *Arch Klin Chir* 132, 290

CHAPTER IV

HISTORICAL

THE first reference to a suprapubic extravesical prostatectomy which I have been able to find is the report by van Stockum¹ of Rotterdam in 1909. He then wrote "Even though the mortality of Prostatectomy is diminishing, it remains a fairly dangerous procedure. The perineal route is without doubt less risky than the suprapubic, but has the disadvantage that a urethro-rectal or perineal fistula may remain, and because of this it is not done by most surgeons. So we must try to improve the suprapubic method. I think that I have made progress in this direction. I believed that it should be possible to do a similar enucleation to the perineal from above. This I have done on two patients in November, 1908."

The Operation.—"Trendelenburg position, mid-line incision from the root of the penis upwards, Recti retracted apart. With the finger the prostate was freed from the symphysis. The peritoneum was drawn upwards with the finger so as to bring the prostate into view. The paravesical spaces were not opened. A small vertical incision a little to one side of the mid-line was made in the capsule down to the tumour. Through this opening first one finger then two gently performed the enucleation. The indwelling catheter helped to orientate the finger whilst the assistant pushed the prostate forwards by means of a finger in the rectum. The enucleation was just as easy as in the Freyer operation. Bleeding was minimal. A large gauze pack was left in the cavity so that post-operative bleeding, one of the great dangers of prostatectomy, was controlled. To drain the bladder, a fairly thick rubber tube was introduced through an opening made in the vault, and fixed to the bladder wall with a stitch. The

¹ VAN STOCKUM, W. J. (1909) *Zbl Chir* 2, 41

In 1945 having noticed for some time the excellent exposure of the prostate during the operation of total Cysto-prostatectomy particularly during the retrograde method described by Frank Hinman (1935)¹ I embarked on cadaver studies with a view to performing a suprapubic extravesical prostatectomy. I quickly appreciated the ease of the approach and unaware of the above mentioned earlier reports of analogous procedures performed my first retro-pubic extravesical prostatectomy in August, 1945. This case aged 72 had been admitted to hospital gravely uræmic with a history that he had been catheterising himself for three years for a complete retention. He was grossly infected and had been unable to introduce the catheter during the previous 24 hours. His tongue was dry brown and furred and the Blood Urea two days after admission despite forced fluids and indwelling catheter was in excess of 200 mgms per cent. His condition slowly improved and three weeks later his Blood Urea had fallen to 54 mgms per cent. The urine was still grossly infected but a successful retropubic prostatectomy was effected. Despite the gross infection present at the time of operation minimal wound infection occurred. His post-operative stay in hospital was seven weeks owing to the development of a not unexpected right femoral thrombophlebitis.

Since this first retropubic prostatectomy I have carried out the approach more than 375 times and this volume is based on these experiences.

¹ HINMAN F (1935) *Surg Gyn. Obst* 60 684

CHAPTER V

SURGICAL ANATOMY

THE SUB-UMBILICAL REGION OF THE ABDOMINAL WALL

THE Rectus Sheath lies deep to the layers of superficial fascia of the abdominal wall, and forms a firm fibrous layer continuous across the mid-line, where it forms the Linea Alba. The sheath is formed just lateral to the outer

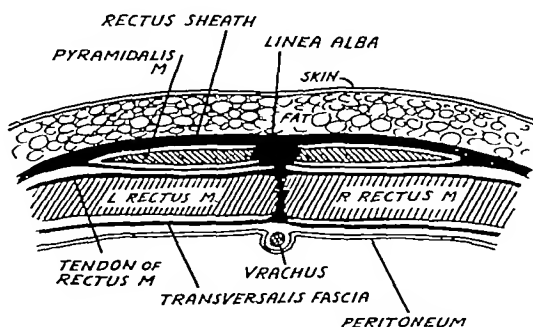


FIG 22

Transverse section of anterior abdominal wall 3 cms above pubis

orders of the Rectus muscles by the coalescence of the aponeuroses of the internal oblique and transversalis muscles, and immediately splits to enclose the Rectus in all its length except the lowest quarter, below the semilunar fold of Douglas, where it lies entirely in front of the muscle. Slightly medial to the outer border of the muscle the sheath is augmented by the addition of the aponeurosis of the External Oblique (Fig 22). The interlacing fibres of the Rectus sheaths form a median raphe termed the Linea Alba. Below the umbilicus this is much narrower than above, and is not more than a cord between the medial borders of the Recti, as it passes downwards it becomes thinner, and is situated on a plane posterior to the muscles,

being attached to the superior pubic ligament on the posterior aspect of the upper border of the pubis. This attachment fans out a little laterally on each side and is called the *admiriculum* of the *linea alba*.

Lying deep to the rectus sheath but anterior to the recti themselves is to be found the *Pyramidalis* muscle which is of very variable size and in fact is absent in 10 per cent of subjects. As usually encountered it is a thin muscular triangle half of which lies on either side of the mid line within a duplicature of the rectus sheath. The fibres take origin from the anterior aspect of the pubic bone and of the symphysis and are inserted into the *linea alba* in its lower 8 cms. In man its supposed action—that of tensing the *linea alba*—is of very minor importance because it suffers division either vertically or transversely without any disability being caused.

The Recti muscles passing upwards in their sheath have their inner margins in contact with one another except for a very thin and tenuous strip of fascia derived from the *linea alba*. Divarication may occur as a result of obesity, intra-abdominal tumour or simply senility and muscular atrophy in which case the *linea alba* alone separates the subcutaneous fatty tissue from the peritoneum. The muscles originate by two flat tendons each about 3 cms wide and 3 cms long which are attached to the anterior lip of the upper border of the pubic bone and of the symphysis blending with one another in the mid line. The origin extends as far laterally as the pubic spine where the lateral portion of the tendon is stronger than the medial part.

Deep to the Recti one finds a thin fascial layer attached in the mid line to the posterior aspect of the *linea alba* and below to the upper and posterior border of the pubic bones. This is the *Transversalis Fascia* which becomes a structure of strength and importance in the inguinal region but does not play much part in any surgical approach in or adjacent to the mid line. It is worth noting that below the semilunar folds it is the only structure separating the posterior aspect of the rectus muscles from the peritoneum.

THE CAVE OF RETZIUS

Lying behind the linea alba and transversalis fascia will be found the prevesical pouch of the peritoneum, covered by what has been called the prevesical fascia. There has been confusion about the nomenclature in this region since Retzius described in 1856 a prolongation of the peritoneal cavity in front of the bladder, which became known as the cavity of Retzius, or Cavum Retzii. In the course of time this name was applied not to the apron of adipose fascial tissue often containing a small peritoneal pouch, but to the space which could be opened up between the bladder posteriorly and the pubis anteriorly by displacing the bladder upwards and backwards (Testut). This space is roughly triangular, the apex being at the umbilicus, and the base reaching to the pelvic floor. It is bounded anteriorly by the transversalis fascia covering the posterior aspect of the Recti, and posteriorly by a fascial layer containing varying amounts of fat, which extends from the umbilicus down to the pelvic floor, covering the anterior aspect of the bladder and prostate, which has been variously named by many authorities (e.g., Umbilico-Prevesical Fascia of Testut, Umbilico-Vesical Aponeurosis of Farabœuf and Delbet, Prevesical Leaf (*feuillelet prévésical*) of Charpy, etc.) We shall refer to it as the Prevesical Fascia, and it will be recognised as the layer which is divided transversely or torn through in the approach to the bladder in suprapubic cystostomy. It is never a thin, well-defined lamina of fascia, but a layer of fibro-fatty tissue, which, in the obese subject, can be separated into anterior and posterior fascial layers enveloping a variable amount of fat, a fact which may account for the multiplication of these so-called spaces, and the addition of further names by more recent writers (e.g., perivesical space and retropubic space, by Strauss,¹ who attempted to define them by injection of radio-opaque media).

In the region of the prostate this prevesical fascia contains several veins, chiefly originating from the deep dorsal vein of the penis, which appears from beneath the symphysis pubis,

¹ STRAUSS, E. (1941) *J. Urol.* 46, 520

and links up with pubic and vesical tributaries of the deep epigastric and obturator veins. Usually such veins are small but occasionally they may coalesce into a larger vessel running in or near the mid line.

If this prevesical fascia is removed and the bladder retracted upwards and backwards the prevesical space is laid open and can be seen to reach the pelvic floor. In the region of the mid-line it is continuous with the fovea pubovesicalis a shallow and narrow recess passing under the symphysis to the apex of the urogenital diaphragm but on each side of this the floor is formed by the pubo-prostatic ligaments or muscles which attach the prostate to the pubis. These ligaments are really a reflection of the endopelvic fascia from the back of the pubis on to the apex of the prostate where they are continuous with and in fact part of the so-called sheath of the prostate formed of the covering of pelvic fascia common to all pelvic viscera. Further laterally the floor is formed by the fascial reflection from the levator ani muscles on to the sides of the prostate vesicles and rectum which makes a firm connection with the fascia of Denonvillier in between the latter two organs. Above the level of the pubis the prevesical space extends as far laterally as the obliterated hypogastric arteries and below that level as far as the internal iliac vessels and great sciatic notch so that it divides itself into an upper portion outside the pelvis and a lower retropubic portion. It is this retropubic portion which concerns us here.

The Retropubic Region—The prostatic capsule which is the next landmark has also been called the sheath or the false capsule of the gland and is—as is indicated above—a layer of endopelvic fascia investing it and adherent to it. The use of the terms false and true applied to the capsules of the prostate has occasioned much confusion. It appears that anatomists writing of the normal organ have described the endopelvic fascia as the false capsule. When an adenoma is present however the layers which surround it and which are left behind when it is enucleated have been grouped together by surgeons and pathologists and termed the false capsule following the teaching of Freyer who thought that

he was practising total enucleation of the gland Cuthbert Wallace, in 1907, first demonstrated that the surgical false capsule really consisted of the anatomical false and true capsules, together with an inner layer of compressed normal prostatic glandular tissue flattened out between the adenoma and the capsule The anatomical false capsule is of importance because it contains a plexus of veins, the plexus of Santorini or prostatic plexus, composed of a collection of vessels of varying size, mostly travelling from below upwards and passing laterally around each side of the base of the prostate Tributaries are derived from the veins draining the anterior surface of the bladder which pass downwards to enter it, and from the deep dorsal vein of the penis ascending after passing through the triangular ligament It also drains the anterior part of the prostate itself It is to be emphasised that these veins are multiple and extremely variable in size, and, while a vertical incision in the capsule would tend to cut few veins, a high transverse incision probably cuts very few more owing to the more transverse direction in which they are running in this region The plexus communicates with the internal pudendal and obturator veins, the vesical plexus on the lower lateral wall of the bladder, and the vesical and internal iliac veins Also found in this layer, postero-lateral to the prostate, are the small prostatic arteries, branches of the inferior vesical vessels, and anteriorly one may meet a branch of the small anterior vesical artery running downwards over the prostate from the bladder The anterior aspect of the sheath contains a small number of lymphatics, but is almost entirely devoid of nerve elements

ABNORMAL VESSELS

Three anomalous arteries may exist in the region of the prostate lying superficial to the endopelvic, but deep to the prevesical, fascia —

(a) **Accessory Pudendal Artery** (Fig 23) — This may be found on the lateral aspect of the prostate According to Buchanan it occurs “occasionally,” and arises from the intra-

posterior aspect of the pubis to reach and pierce the urogenital diaphragm antero-lateral to the apex of the prostate

(c) **Abnormal Obturator Artery** (Fig 25).—This is a better known anomaly, occurring, according to Gray, in 28 per cent of subjects. It replaces the normal vessel, and arises from the deep epigastric of the same side near its origin, passing behind the lacunar ligament, and downwards to the

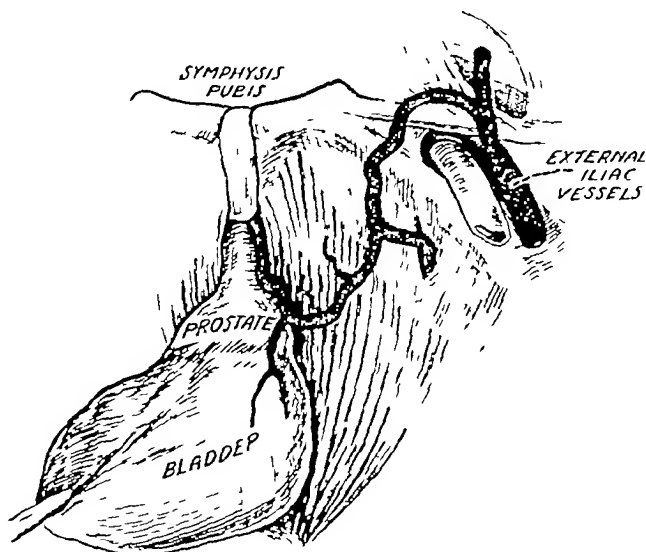


FIG 25
Abnormal Obturator Artery

obturator canal. It does not itself lie close to the prostate, but its vesical branch, which normally arises from the obturator artery in the pelvis, may pass via the pubo-prostatic ligament and anterior aspect of the prostate to the bladder.

It should be noted that these arteries may be present with or without their accompanying veins, and that in occasional cases the veins only may be found.

The True Capsule.—Within the fascial sheath developed from the endopelvic fascia is found the true anatomical capsule of the prostate, formed of a fibro-muscular stroma surrounding and uniting the two lateral halves, and intimately blending with the interstitial tissue of the gland. This layer is not of great thickness or consequence except in the mid-line, where it forms the anterior commissure, in which there is no glandular tissue. At the upper end the anterior commis-

sure blends intimately with the muscle fibres of the internal sphincter and of the bladder wall while at the lower end the muscular fibres of the external sphincter extend upwards for a distance of as much as a centimetre from the apex of the prostate

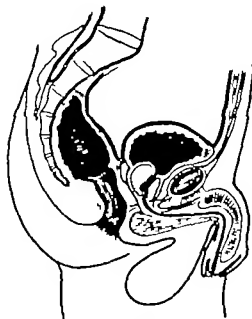


FIG 26

Sagittal Section of Male Pelvis

In the pathological gland containing an adenoma the normal gland tissue is compressed peripherally by the tumour which grows centrally from the region adjacent to the urethra but it still remains true to say that anterior to the urethra there is only the commissure in practically every case. This is because the adenoma grows in the form of lobes and the only exception is to be found in the very rare case that has a pure anterior lobe and then this is always situated at the upper end of the gland in the region of the internal sphincter. Normal gland tissue is compressed around the periphery of the adenoma to form the surgical capsule.

BLOOD SUPPLY OF THE PROSTATE

Arterial Distribution—The prostatic branches of the inferior vesical artery pass through the capsule into the gland

anterior aspect of the pubis to reach and pierce the urogenital diaphragm antero-lateral to the apex of the prostate.

(c) **Abnormal Obturator Artery** (Fig 25) — This is a better known anomaly, occurring, according to Gray, in 28 per cent. of subjects. It replaces the normal vessel, and arises from the deep epigastric of the same side near its origin, passing behind the lacunar ligament, and downwards to the

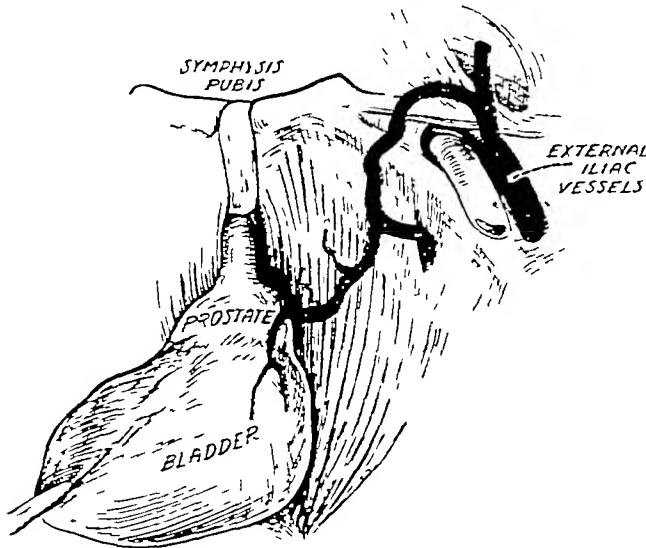


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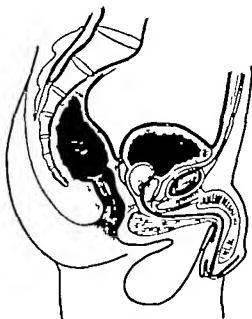


FIG. 26

Sagittal Section of Male Pelvis

In the pathological gland containing an adenoma, the normal gland tissue is compressed peripherally by the tumour which grows centrally from the region adjacent to the urethra but it still remains true to say that anterior to the urethra there is only the commissure in practically every case. This is because the adenoma grows in the form of lobes, and the only exception is to be found in the very rare case that has a pure anterior lobe, and then this is always situated at the upper end of the gland in the region of the internal sphincter. Normal gland tissue is compressed around the periphery of the adenoma to form the **surgical capsule**.

BLOOD SUPPLY OF THE PROSTATE

Arterial Distribution—The prostatic branches of the inferior vesical artery pass through the capsule into the gland

in the postero-lateral region, in front of the seminal vesicle at the level of the bladder neck (Fig 27) Their course and distribution have been described by Flocks There are

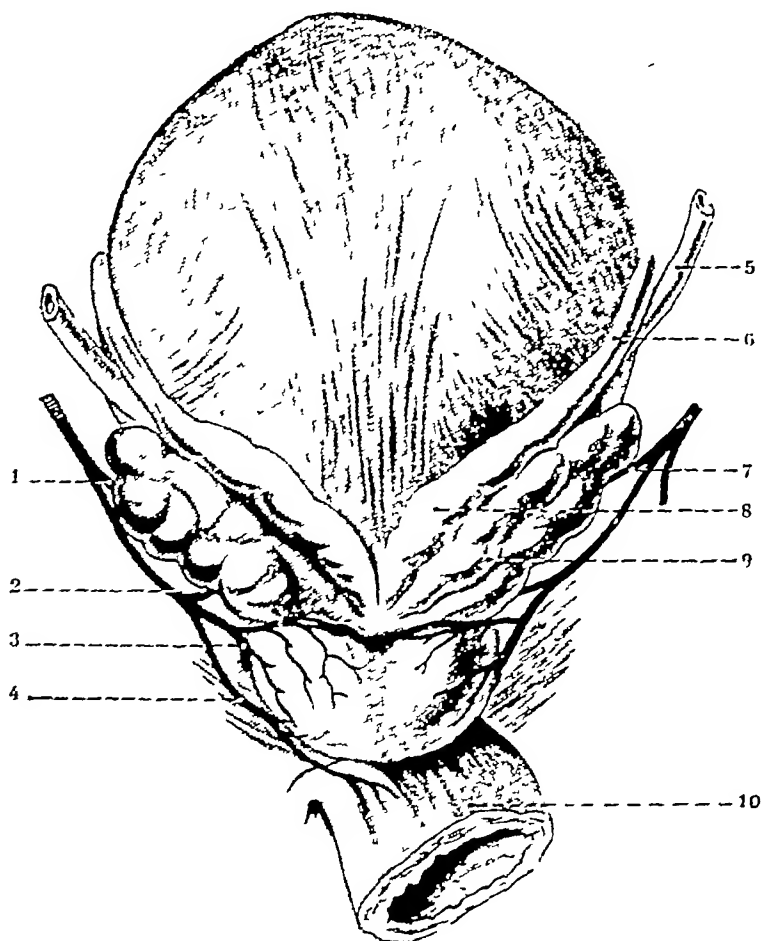


FIG 27

Arteries of the prostate, seen from the back (after Albarran)
 1 Inferior vesical artery dividing into branch supplying seminal vesicle and vas deferens (7) and branches supplying prostate and bladder base (2, 3) 4 Haemorrhoidal branches 5 Ureter 6 Vas Deferens 9 Seminal Vesicle 10 Rectum

usually about four vessels either side in a close group, which soon after entering the gland substance, break up into a variable number of smaller branches, the distribution of which is fairly constant The two main branches are internal (or urethral) and external (or capsular)

The former penetrate the gland very close to the vesico-prostatic junction, and supply the region of the vesical neck

the central part of the prostate immediately adjacent to urethra as far down as the upper limit of the verumontanum. These vessels are of fairly large calibre, and anastomose freely around the urethra.

The latter, capsular, group pass along the postero lateral aspect of the gland and send branches anteriorly and posteriorly to supply the peripheral part about two-thirds in of the whole gland including the verumontanal region. There is moderate anastomosis with the urethral group of arteries. When adenoma formation occurs the tumour is supplied by the urethral group of vessels almost entirely.

Venous Drainage.—Multiple small veins pass out from the sides of the gland to join the prostatic plexus as it lies in the fibrous covering of the gland and others traverse the posterolateral corner to reach the inferior vesical vein on the upper aspect of the levator ani muscle.

The prostatic plexus of veins—The deep dorsal vein of the penis passes beneath the subpubic ligament in front of the membranous urethra and appears in the retropubic space on the anterior aspect of the prostate within the endopelvic fascial sheath. Here it branches into a very variable number of small veins which pass in a direction generally upwards but turning outwards towards the upper part of the gland so that the bladder neck all the veins are passing backwards around the lateral wall. There is free anastomosis between the branches and tributaries come from the gland tissue itself from the obturator veins and from the veins draining the bulb and corpora cavernosa which reach the plexus by traversing the urogenital diaphragm. The plexus then passes on to the upper and lateral wall of the bladder at the point where the ureter enters the wall. It receives vessels from the vesicles and bladder and finally as the inferior vesical vein empties itself into the internal iliac vein.

NERVE SUPPLY

This is derived from the hypogastric plexus and from the second, third and fourth sacral roots. The fibres do not form

a single nerve, but reach the gland as a group of nerve fibres accompanying the prostatic arteries. The majority enter the gland substance with these vessels, the remainder proceeding downwards and inwards on the posterior aspect to reach the region of the ejaculatory ducts

SURGICAL ANATOMY IN THE FEMALE

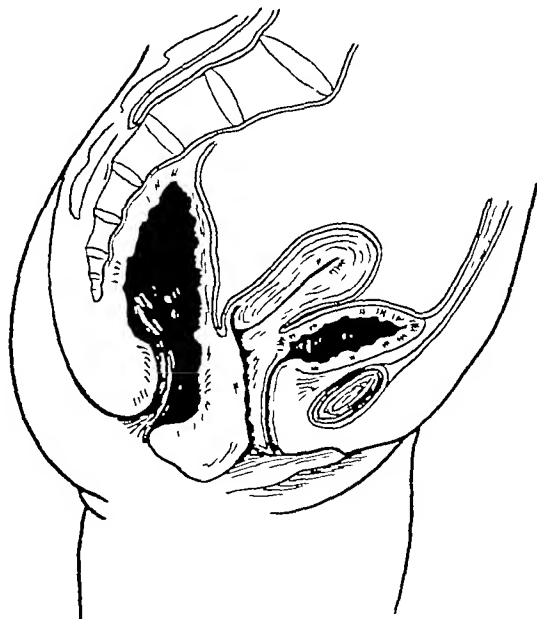


FIG 28
Female Sagittal Section

The prevesical fascia extends downwards in front of the bladder in the same fashion as in the male, and the retropubic space can be opened up by displacing the bladder backwards. There being no prostate, the vesical neck is situated on a slightly lower level, so that the internal meatus is on a level with the mid-point of the symphysis pubis, that is, about 1.5 cms below the level of the upper border of the pubis. The pubo-vesical ligaments can be seen at a slightly lower level, and the retropubic fossa between them. Lying in this fossa, covered by a layer of endopelvic fascia, which extends each side around the vagina, is the urethra, lying on the anterior vaginal wall. The fascial sheath contains a plexus of veins analogous to the prostatic plexus, but much smaller, receiving the dorsal vein of the clitoris as its tributary. Four-

fifths of the urethra is above the urogenital diaphragm, equivalent to a length of at least three cms. This lies upon the anterior vaginal wall and in its upper third is relatively free being attached only by loose cellular tissue though in its lower two-thirds it becomes more adherent so that its muscular walls blend with the vaginal musculature

CHAPTER VI

PRE-OPERATIVE CARE

THE pre-operative care of the patient requiring surgical intervention for prostatism will vary exceedingly. Such a variety of concomitant pathology may be associated that no one régime will suffice and no two urological surgeons will agree on the ideal method for each case.

The question of preliminary drainage is a vexed one. There are some surgeons who advise a minimal period of ten days' urethral catheter drainage prior to all surgical interventions on the prostate excluding abscesses, others who rely almost invariably on a preliminary cystostomy, whilst a few like Wilson Hey¹, give the apparently heretic advice of immediate prostatectomy without any urethral instrumentation irrespective of retention, acute or chronic. As ever, a *via media* would appear to be the soundest policy.

The case presenting uninfected urine, adequate renal function tests, normal straight and intravenous urographic films should, I believe, be operated upon without pre-operative instrumentation. Cysto-urethroscopic examination, to rule out vesical neoplasm, etc., and to assess the exact configuration of the obstruction is carried out as part of the operative technique after the patient has been suitably anaesthetised. The necessary armamentarium for both retropubic prostatectomy and transurethral resection is to hand and the selected procedure carried out there and then.

Some clinics make it a rule to carry out routine catheterisation to estimate residual urine, and preliminary cysto-urethroscopy and cysto-urethrography for exact diagnosis before the day of operation. These we have found neither necessary nor desirable, as a routine, and are employed only when specially indicated, diagnosis being in doubt, etc. From

¹ WILSON HEY (1945) *Brit J Surg* 33, 41

time to time unpleasant reactions such as urinary tract infections or precipitation of acute retention will follow despite every precaution

Where the clinical examination, which must always be careful suggests cardio-vascular incompetence a full cardiological assessment including electrocardiographic study should be made. Many an old man's cardiovascular system is benefited by rest in bed with graduated and controlled exercises with or without Digitalis. I have the impression that this drug in small doses e.g. Digoxin 0.25 mgm two or three times a day is often helpful.

The following case illustrates the benefits to be derived from such preliminary treatment —

DEK, æt. 68 history of rheumatic heart for 30 years with four attacks of coronary thrombosis five-year history of increasing frequency and difficulty of micturition. Three months previously F D/N 10/4 hourly so suprapubic cystostomy advised and performed elsewhere. Patient complained bitterly of suprapubic tube and sought relief whatever the risk. Blood Urea 36 mgms per cent obvious signs of cardiac failure with auricular fibrillation. Digitalis rest in bed with controlled exercises for three weeks condition improved remarkably.

97/46 Retropubic Prostatectomy (large trilobed gland)
fistula curetted

147/46 Catheter removed voided freely without leakage

277/46 Ready for discharge from hospital but elected to remain for domestic reasons

68/46 Returned home

Where the clinical examination or renal function studies suggest or prove marked renal impairment, measures must be taken to secure a return to normal or at any rate a stabilisation before prostatic surgery is undertaken. In many cases the judicious use of the indwelling catheter forced fluid intake either orally or intravenously combined with small doses of Sulpha drugs will restore to relative normality kidneys badly

damaged by so-called "back-pressure" effects and make prostatic surgery reasonably safe

Illustrative Cases —

W R D , æt 67 prostatic symptoms for more than 2 years culminating in retention with overflow in June 1946

18 6 46 Foley catheter passed and slow decompression instituted Blood Urea 200 mgms per cent , Urea Clearance 50 per cent , bilateral vasectomy Blood Urea fell to 50 mgms per cent , with 10 days' catheter drainage Discharged home wearing Foley catheter to await further general improvement

16 7 46 **Retropubic Prostatectomy.**

21 7 46 Catheter removed , voided well without leakage

3 8 46 Discharged home

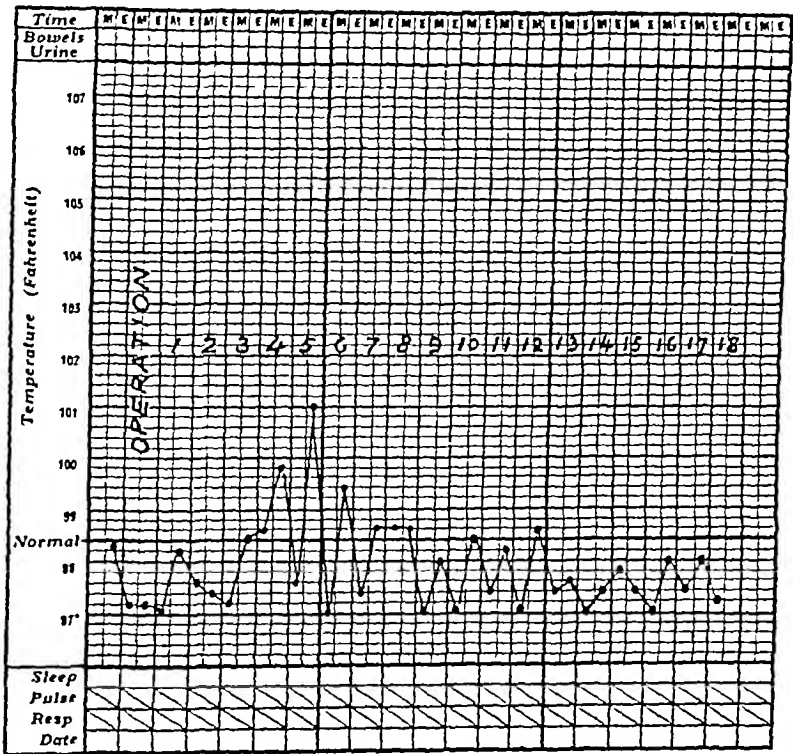


FIG 29

Temperature Chart

G H G , æt 71 , advanced Parkinsonism , overflow retention , Stab cystostomy elsewhere 12 months previously , general con-

dition poor condition miserable with constant leakage and persistent pain X-Rays revealed multiple calculi in bladder large prostate on rectal examination Blood Urea 42 mgms per cent. Cystoscopy showed tri lobed intravesical projection long prostatic urethra 5 calculi in bladder

26.1.46 Retropubic Prostatectomy with removal of calculi through vesical sphincter

2.2.46 Catheter removed urination with very slight suprapubic leakage

4.2.46 Dry

8.2.46 Discharged

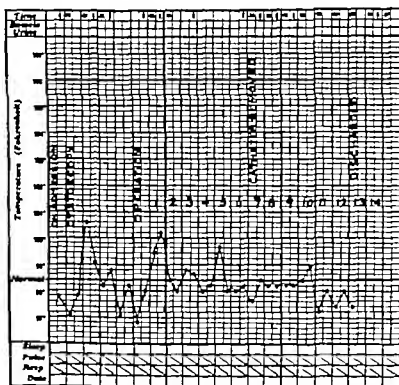


FIG. 30

Temperature Chart

T W W æt 55 long history of poor urinary stream 2 years previously investigated intravenous urograms showed dilated ureters and renal pelvis distended bladder intervention refused nocturnal incontinence developed accompanied by anorexia thirst and other manifestations of uræmia

Admitted to hospital, catheter decompression commenced, 2 days later rigors and pyrexia, Penicillin administered 20,000 units every 3 hours, prompt subsidence of temperature, Penicillin continued for 5 days

13 5 46 Retropubic Prostatectomy; fibroadenoma enucleated with some difficulty; bladder neck markedly sclerotic; wedge excised



FIG 31

Intravenous Urogram 3 months post-operatively

- 19 5 46. Catheter removed, voiding urine well.
- 24 5.46. Suprapubic leakage; catheter replaced
- 26 5.46. Catheter removed No further leakage.

- 6 6 46 Discharged to his home in Wales
 20 8 46 Reported for check up Very well F-D/N
 normal/l stream excellent.
 Intravenous Urograms still show pelvic dilatation
 (Fig 31)

Other cases with marked renal failure that have not responded or are not likely to respond, to ten days urethral catheter drainage will require a temporary suprapubic cystostomy of weeks or months duration to relieve adequately the back pressure effects. In all cases where no pressing contra-indication exists the patient should be encouraged to get out of bed for a period each day.

Illustrative Case —

E H æt. 69 ten years history of urinary frequency and difficulty twelve months previously overflow retention with uræmia necessitated cystostomy blood urea now 33 mgms per cent. Hypertension B P 240/140 large prostate on rectal examination

- 28 5 46 **Retropubic Prostatectomy**, wound reopened same evening for excessive suprapubic hæmorrhage bleeding vessel sutured blood transfusion
 30 5 46 Evident jaundice probably result of some incompatibility of blood
 5 6 46 Catheter removed voided with leakage
 8 6 46 Catheter replaced
 15 6 46 Catheter removed voiding without leakage
 27 6 46 Discharged soundly healed
 13.8 46 Seen at follow up clinic very well F-D/N 3 hourly/3

Gross urinary sepsis is again another indication for a postponement of prostatic surgery. The indwelling urethral catheter and Sulpha drug antisepsis and possibly Penicillin with or without bladder lavage, will clean sufficiently many a dirty bladder others will require a cystostomy.

Illustrative Cases —

Dr P æt. 77 fifteen years history of increased frequency difficulty and intermittent hæmaturia. Admitted to another

hospital with clot retention; relieved by catheter but gross infection followed; seen in consultation Cystoscopic examination revealed residuum 1,000 ccs grossly purulent urine, enormous intravesical prostatic projection; no papillary tumour of bladder seen Cystostomy advised but refused Catheter drainage continued for 3 weeks Blood Urea fell to 35 mm.gms per cent.

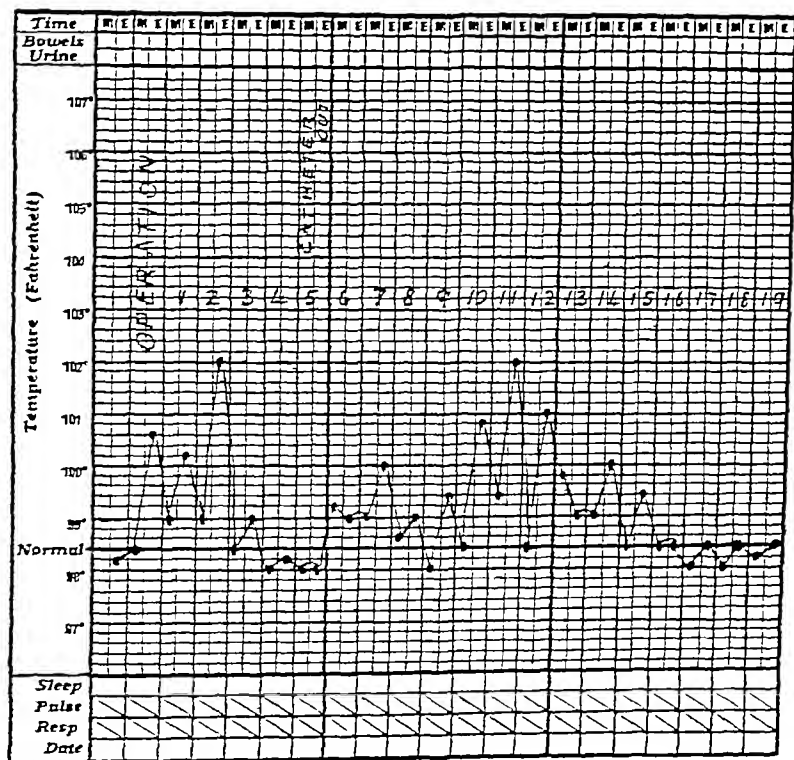


FIG 32

Temperature Chart Dr P

23.7.46. Retropubic Prostatectomy.

28.7.46. Catheter removed; voided without leakage
Slow convalescence owing to prolonged urinary infection.

13.8.46. Discharged home

Where catheter drainage is required either because of retention, acute or chronic, renal insufficiency or gross urosepsis, the catheter is promptly connected with a closed drainage

system such as that of Dukes (Fig 33) or a tidal drainage apparatus (Fig 34) I regard intermittent emptying of the bladder as more physiological than the commonly employed method of keeping the bladder constantly empty. In a markedly thickened hypertrophic vesical wall a state of constant emptiness may lead to a compression of the ureteric

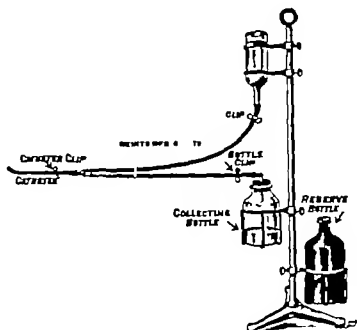


FIG 33
Dukes Apparatus

orifices and a damming back effect on the ureteric efflux (we have many examples of the ill effects of a relatively small increase of extra ureteric pressure leading to anuria, e.g. retro-peritoneal hæmatoma following gynæcological operations in the pelvis of which I have met three examples) The following two cases appear to me to be suggestive in this connection neither led to anuria but both showed the development of an ascending infection in a previously damaged upper urinary tract.

- L B æt. 76 overflow retention with uræmic symptoms
- 8 6 45 Catheter decompression
- 11 6 45 Suprapubic Cystostomy
- 21 6 45 Discharged for renal stabilisation

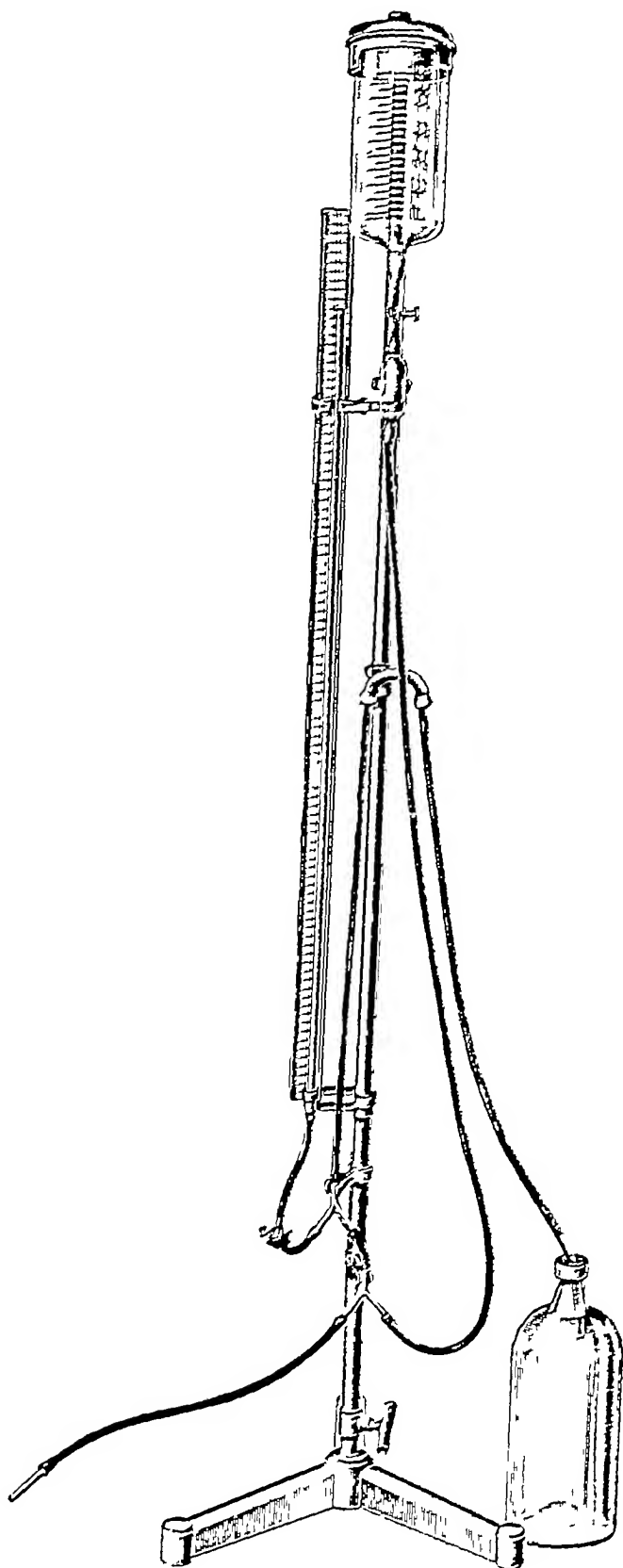


FIG 34
Tidal Drainage Apparatus

- 19 7 45 Re-admitted with pyrexia 102° bulging in left flank history then elicited that nephrectomy had been advised 30 years previously for hydro-nephrosis operation then refused but periodic attacks of left sided pain ever since
- 26 7 45 Left Nephrectomy for large pyonephrosis stormy convalescence
- 21 8 45 Discharged
- 5 11 45 Second stage Retropubic Prostatectomy
- 12 11 45 Catheter removed voiding without leakage
- 20 11 45 Discharged soundly healed.

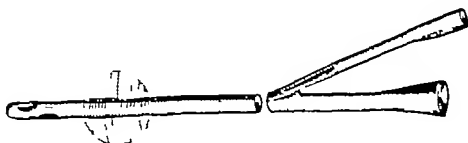


FIG. 35
Foley Catheter

J C. at 65 prostatic history for more than 10 years chronic urinary infection residual urine 650 c.cs infected IVP dilated left upper urinary tract. Blood Urea 62 mgms. per cent.

- 6 6 45 Suprapubic Cystostomy
- 20 6 45 Discharged for renal recovery
- 18 7 45 Blood Urea 35 mgms per cent. Freyer Enucleation
- 7 8 45 Pyrexia rigors and bulging left flank. Intensive Sulpha therapy
- 10 8 45 Condition very poor Left Nephrostomy
- 22 9 45 Discharged soundly healed.
- 12 4 46 Re admitted with pyrexia and painful left kidney IVP showed normal right kidney left kidney hugely dilated with poor excretion
- 16 4 46 Left Nephrectomy
- 10 5 46 Discharged.

The frequency with which the Clip (Fig 33) will be released to allow the bladder to empty will vary from case to case according to renal excretion and vesical irritability, but as a general rule it is released every two hours. In the vexed question of sudden versus gradual emptying of the chronically distended bladder,^{1,2} I compromise. For the first twelve hours after the introduction of the catheter I allow the bladder to empty slowly by incorporating a Murphy drip in the outlet tube, thereafter the intermittent method of emptying and filling as described above. It has been my experience that whatever method of decompressing the chronically distended

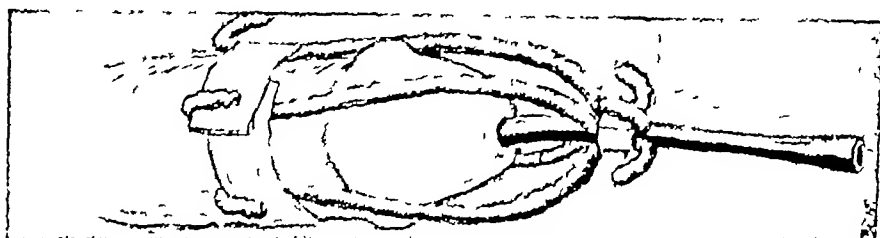


FIG 36

"Pipe cleaner" method of Catheter Fixation

bladder is employed, the urine usually becomes bloodstained on the second or third day. Where lavage is indicated the irrigating medium usually employed is Acriflavine 1/6,000, the bladder being washed out every eight hours, or more frequently where Tidal Drainage is used. Where the bacteriological study of the urine shows a *Pyocyanus* infection, Acetic Acid 1/500 or Phenoxetol 2.2 per cent is employed as the irrigating medium. The latter or Urea Formic Iodide 1/40, combined with Sulphanilamide orally, is used where the organism is *B. Proteus*. Unless gross renal insufficiency is present Sulpha drugs are administered routinely in small doses, e.g., $\frac{1}{2}$ -1 gram every six hours, Sulphathiazole and Albucid being those most commonly prescribed. When obtainable, the 5 c.c. Foley type of catheter (Fig 35) is preferred but latterly it has been impossible to obtain this model, and a No. 15 F rubber Tiemann catheter held in position with pipe

1 CRUICK, C. D. (1938) *J. Urol.* 39, 403

2 BAILEY, HAMPTON (1944) *Emergency Surgery*

cleaners and a loose encircling band of Elastoplast has been effectively employed (Fig 36)

It may be noted here that Sulphathiazole which we use almost routinely produces a febrile reaction in a proportion of cases (perhaps 10 per cent) after a period of 7-10 days

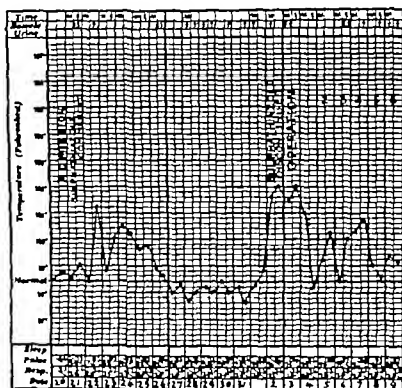


FIG 37

Pre-operative Sulphathiazole reaction Despite toxic manifestations pyrexia rash etc operation proceeded with successfully

use. Stopping the drug will lead to a prompt subsidence of the pyrexia. If further Sulpha therapy is indicated later another compound e.g. Albucid (Sulamid) should be employed.

The temperature charts (Figs 37 38) illustrate this Sulpha drug pyrexia one case developing the condition pre-operatively during catheter drainage the other post-operatively

ploying a trocar such as those devised by Kidd or Riches (Figs. 39 40) we prefer a classical exposure of the bladder

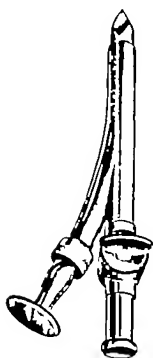


FIG 39
Kidd's Trocar

through a small 3 cm incision this in addition to ensuring that the peritoneum is out of danger also permits a digital exploration of the vesical cavity. I employ a stab technique only in the very frail where decompression appears to be indicated and where catheterisation is impossible. Occasional unpleasant or even disastrous sequelæ to the stab method even in the best hands in my opinion outweigh its advantages in most instances (Sheaf)¹

Large vesical calculi

will usually require a preliminary suprapubic removal this can be followed 2-3 weeks later by a retropubic second stage prostatectomy

The method of dealing with smaller vesical calculi at the time of a retropubic enucleation will be described in a later chapter. Fig 42 illustrates such a case in which a successful prostatectomy with simultaneous removal of the calculi through the vesical sphincter was effected in a man aged 82

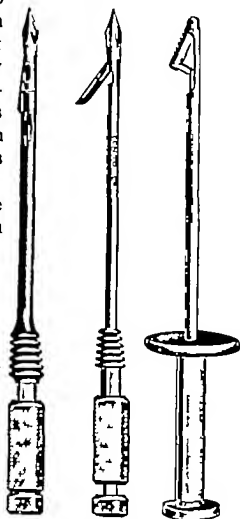


FIG 40
Riches Trocar

¹ SHEAF T. W. B.M.J. (1940) 1 331

Papillary Tumours of the Bladder associated with prostatic obstruction often present a difficult therapeutic problem. Where cystoscopic fulguration can eradicate the tumours this is employed as a preliminary measure, and the obstruction



FIG. 41

Large vesical calculus associated with prostatic hypertrophy necessitating preliminary suprapubic cystostomy

dealt with later either by transurethral resection or by retropubic prostatectomy. Where retention demands early relief of the obstruction, a transurethral resection of the prostate may be the primary procedure. This may be followed by cystoscopic fulguration. Other cases may require a preliminary suprapubic cystostomy, followed by prostatectomy. This may be followed by cystoscopic fulguration, or by transurethral resection, or by retropubic prostatectomy. The latter is the procedure of choice in cases of prostatic hypertrophy associated with a large vesical calculus.

require total cysto-prostatectomy after preliminary uretero-colic transplantation

From time to time a retropubic extirpation of the prostate may be carried out in combination with a transvesical



FIG. 42

Vesical calculi removed through vesical phincter at time of retropubic prostatectomy

operation for vesical tumour as is well shown in the following case

C.H.M. æt. 70 complained of typical prostatic symptoms for some years becoming progressively worse. During preceding 15 months several attacks of hæmaturia. Rectal examination revealed considerable benign prostatic enlargement, and on cystoscopy a large papillary tumour was visualised on the right lateral vesical wall.

22.8.46. Transvesical endothermic excision of papillary tumour as large as a golf ball No apparent invasion of muscularis Mucosa resutured over raw area. Bladder sutured in two layers Retro-pubic extirpation of enlarged prostate

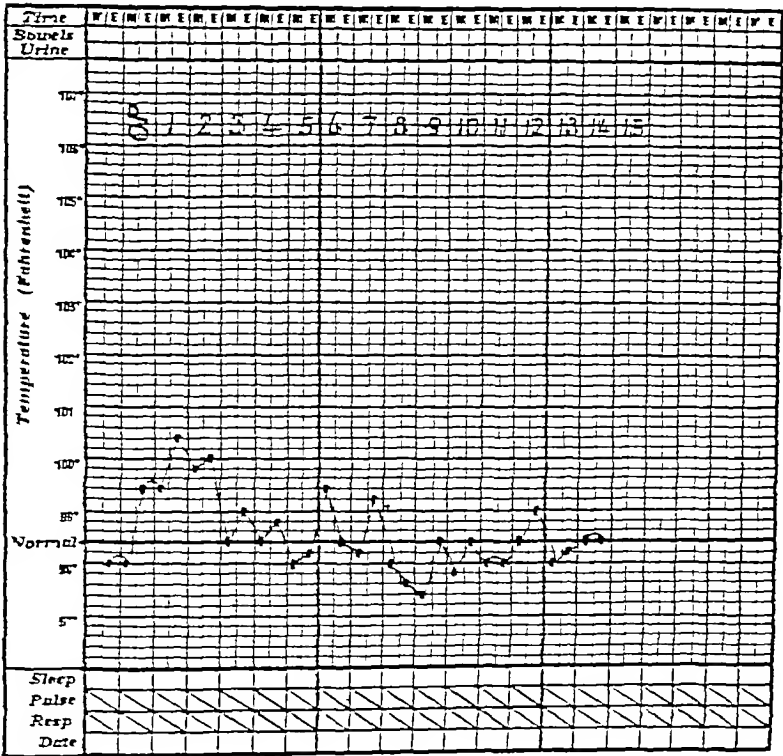


FIG 48
Temperature Chart.

- 27.8.46. Catheter removed ; voiding without leakage
- 12.9.46 Discharged.
- 23.10.46. General condition excellent F normal/1; S excellent.

The following case necessitated an unusual therapeutic sequence :—

J.R., æt. 76, complained of marked prostatic symptoms for several years; two open operations for vesical papilloma 1935 and 1944; rectal examination revealed large adenomatous prostate; cystoscopy showed extensive recurrence of papillary tumours in bladder; patient's age and general condition precluded a Total Cysto-prostatectomy. It was decided not to

re-open the bladder but to remove the prostate extra vesically and later to deal with the papillary tumours endoscopically

17 6 46 **Retropubic Prostatectomy**

Catheter drainage maintained for 3 weeks to minimise the likelihood of papillary implants on raw prostatic bed.

8 7 46 Endoscopic resection and coagulation of papillary tumours in bladder

19 7 46 Discharged

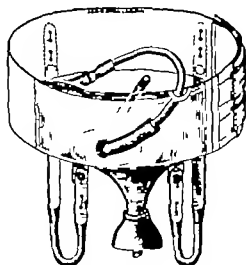


FIG 44

Millin's Suprapubic Bag This model avoids the flapping against the leg noted by those wearing the customary appliance. Also the bag may be emptied surreptitiously through the usual exitus from the trousers

Cases requiring suprapubic drainage of some months duration to allow for recovery of impaired renal function are usually dismissed from hospital wearing the author's suprapubic bag depicted in Fig 44

CHAPTER VII

INTRAVENOUS THERAPY

THE importance of administering a forced fluid intake to the urological patient undergoing surgical intervention, particularly those suffering from the effects of prostatic obstruction, has long been recognised. Too few, however, appear to give sufficient attention to the basic principles underlying such fluid administration. It is essential to appreciate the physiological principles governing the maintenance of fluid balance in the body.

The normal human body contains 60 per cent water of which approximately 80 per cent is intracellular, 5 per cent in the plasma and 15 per cent in the lymph, intercellular fluid and glandular secretions. The organism is singularly intolerant of water deprivation, and indeed also of excessive administration, which can give rise to the condition known as "water intoxication". In the extracellular fluid the basic radicle is Sodium, whilst in the cells Potassium is the corresponding radicle, neither of these can pass through the membrane formed by the cell wall. A fluid balance is obtained by the equalisation of the osmotic pressure each side of the membrane by the movement of water from one side to the other. The osmotic pressure of the blood (and so, in turn, that of the cells) is regulated by the kidneys which maintain it at a remarkably constant level. For example, if Sodium is given intravenously or by the mouth and so absorbed into the blood stream, it will tend to increase the osmotic pressure of the circulating plasma which results in diminished excretion of water by the kidneys, so reducing the pressure until all the excess Sodium has been excreted. A normal daily diet contains about 10 grammes of Sodium Chloride, the greater part of which is absorbed into the blood stream but only about 2 grammes of this is retained for metabolic pro-

cesses the remainder being excreted as sodium chloride in the urine.

In the course of 24 hours the normal body loses at least 500 c.cs of water from the lungs and skin, about 250 c.cs from the various glandular secretions including sweat not more than 150 c.cs by the bowel and about 1500 c.cs in the urine a total varying from 2750 to 3500 c.cs During the 24 hours following a major operation this may be thus increased¹ —

Skin and lungs	1250 c.cs
Sweat	750 c.cs.
Urine	1250 c.cs
Blood Loss up to	500 c.cs
<hr/>	
Total	3750 c.cs.

If the patient is unable to drink during this period then a degree of dehydration is produced which can only be remedied by administering water to replace the fluid which has been lost. It is incorrect to give this amount of normal saline intravenously (as is so frequently done) in the belief that the fluid loss is being replaced because in e.g. 3 000 c.cs of such saline there is about 25 grammes of sodium chloride. As mentioned earlier the normal daily ingestion of this salt is about 10 grammes so the blood then contains 15 grammes excess sodium chloride tending to raise the osmotic pressure of the blood and so causing the kidneys to retain water until the excess sodium has been eliminated. If there has been excessive loss of chloride through vomiting or sweating the salt should certainly be given. An excellent practical application of this is seen in the pits. If miners drink water freely after having lost much sodium chloride by sweating there is a slight fall in the osmotic pressure of their extracellular fluids causing intense muscular cramps. If they drink dilute saline they can restore the lost volume of fluids without jeopardising the osmotic pressure and the cramps do not occur.

Undoubtedly the most generally satisfactory way of giving water to the patient is by the mouth, the gastro-intestinal tract being capable of absorbing enough to make up in a few

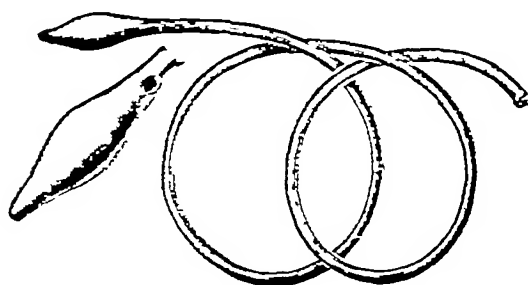


FIG 45
Ryle's Tube

hours what has been lost. In many cases this mode of administration may be impossible for a variety of reasons—disinclination on the part of the patient, vomiting, hiccoughs, etc.—and an alternative route must be found. Tap water given per rectum by means of a small catheter by

the drip method can be extremely satisfactory and quantities up to 5000 c.cs. can be thus given in 24 hours. Fluids may be given subcutaneously (they must be isotonic) and from time to time this route may be used with advantage. It has the merit that excessive absorption is impossible, and the demerit that to most patients the process is unpleasant, if significant amounts must be given.

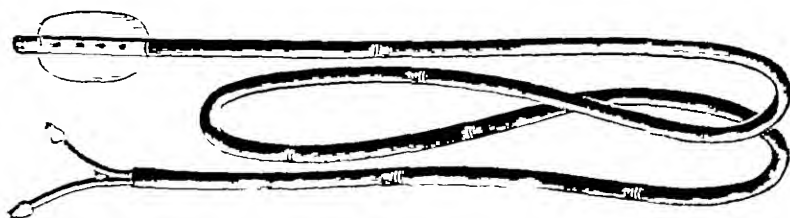


FIG 46
Miller-Abbott Tube

The intra-duodenal method of administering fluids is, I think, too seldom employed and in the uræmic or hiccoughing patient where restlessness, poor veins or lung or cardiac complications contra-indicate intravenous fluid administration, it can be life saving. The fluid is allowed to drip via a Ryle's or Miller-Abbott tube.

The intravenous route is, of course, that most commonly adopted to-day where adequate oral administration is impos-

sible. Great care must be taken lest the right side of the heart be overtaxed and moist sounds at the bases of the lungs will in general be a contra indication. The prime indications for intravenous therapy are

- a replacement of blood loss
- b induction of a diuresis

The most satisfactory method of replacing blood loss during or after operation is by blood transfusion, the usual well known precautions as to grouping cross matching etc being taken. From time to time despite every precaution reactions or even disasters will follow blood transfusion but in the realm of prostatic surgery the timely administration of blood has saved many a life. A sudden blood loss accompanied by a marked fall of blood pressure calls for prompt measures in these patients. Intravenous saline is useless it merely dilutes the blood the patient becomes waterlogged the heart overloaded and death may follow especially if the myocardium is already weakened. The operation of prostatectomy is by the nature of things performed on part-worn material and it is rare to find a completely healthy cardio-vascular system. In such an emergency the blood pressure reading affords the best criterion. A minimal pressure of 50 mms Hg is necessary for renal glomerular filtration in the absence of which anuria will follow. Moreover, a central nervous system long accustomed to a systolic pressure of 200 mms Hg will not readily tolerate a drop to 100. At the operation of prostatectomy a sudden blood loss may be succeeded by a slower but steady bleeding over a period of hours or even days outstripping adequate replacement by the body. In such circumstances it is essential to replace the blood which has been lost fast enough to maintain the blood pressure within reasonable limits but not so rapidly that a frail myocardium is overtaxed. If suitable blood is not to hand the period of waiting may be usefully tided over by the infusion of plasma.

Where a wish to induce a good diuresis is the reason for intravenous therapy there is no better solution than 4.285 per cent Sodium Sulphate as first recommended by Sir Henry

Wade¹ and his co-workers in Edinburgh This "foreign substance" is rapidly excreted by normal kidneys by "tubule diuresis" With damaged or infected kidneys it will not be so successful because of the impeded glomerular filtration None the less even in such cases it can be extremely useful.

In all prostatic cases a detailed and accurate Intake and Output Chart must be kept Discrepancies on either side must be investigated and if possible remedied It is my invariable rule to stress pre-operatively to every patient the importance of attaining a minimal daily fluid intake of six pints (3500 c cs) This helps to eliminate nitrogenous waste products from the body and also assists by its mechanical action in maintaining free drainage through the catheter

1 WADE, HENRY, DICK, J L (1934) *Edin Med J* 41, 12

CHAPTER VIII

ARMAMENTARIUM

A retropubic prostatectomy can be carried out without the use of any special instruments but we have introduced a number which we feel make for ease in its performance These will be described and illustrated

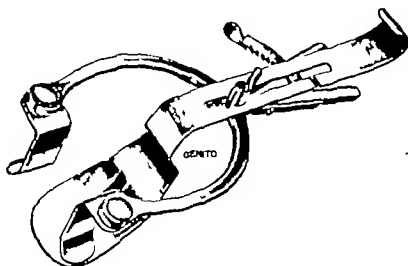


FIG 47
Author's self retaining retractor

Self retaining Retractor (Fig 47) —This model allows for a rapid introduction and removal the lateral blades working on a reversed scissor principle as in the Legueu model The lateral blades are short merely sufficiently long to penetrate the abdominal wall and retract the Recti in a patient of average build An interchangeable rather longer pair is available to answer satisfactorily in the excessively obese patient The upper blade is also rapidly introduced and fixed to the frame by means of a fly nut allowing for a variable position This blade was originally made flexible so that it could be depressed at will but further experience has shown that this is not necessary and repeated boiling soon altered

the flexibility. In the excessively stout the laying of a folded swab on the anterior surface of the bladder will enable the upper retractor blade to depress the bladder sufficiently

Boomerang Needle (Fig 48) —The handle is of the standard pattern introduced originally by Young, but somewhat longer. Mr Shranz of the Genito-Urinary Mfg Co has effected considerable improvements in the actual needle. The



FIG 48
Boomerang Needle and Holder



FIG 49
Harris Ligature Carrier

accompanying illustration depicts better than words the improved eye, which allows a smooth withdrawal not always obtainable with the obliquely set eye. By grooving the needle from the eye towards the point the catgut lies more snugly, the projecting "shoulders" of the gut being minimal, another factor making for easy withdrawal through the tissues.

The Ligature Carrier (Fig 49) —This is of the pattern devised by Harris, angled, and with a larger fork than in Young's original pattern.

T Capsule Forceps (Fig 50) —A pair of these are utilised to grasp the distal cut edges of the capsule and so to control the venous bleeding without devitalising the tissue. They are also angled to allow for easy application under the pubis. In cases where a very large gland is being dealt with and where

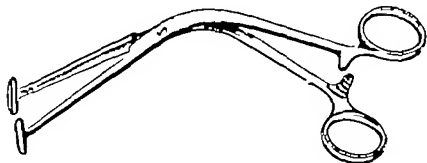


FIG 50
T Capsule Forceps

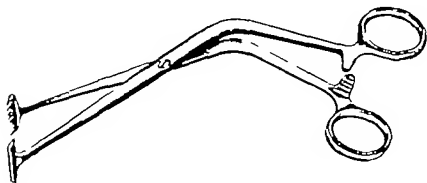


FIG 51
Volsellum

a wide incision is necessary two pairs of forceps may be necessary

Volsellum (Fig 51) —This toothed instrument jaws 15 cm wide is useful to retract upwards the proximal flap of capsule from the underlying adenoma and allow for easy insertion of the upper stay suture

Bladder Neck "Spreader" (Fig 52) —This simple little instrument has proved infinitely helpful. It readily opens the

bladder neck after the enucleation, allowing inspection of the posterior lip and accurate wedge resection. It also makes for easy introduction of the catheter tip into the bladder, and, on occasion, for visualisation of the interior.

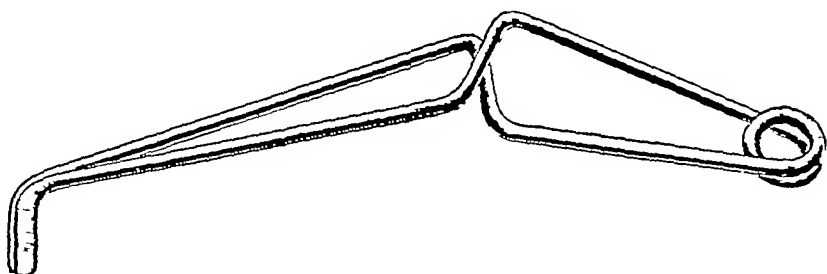


FIG 52
Bladder Neck Spreader

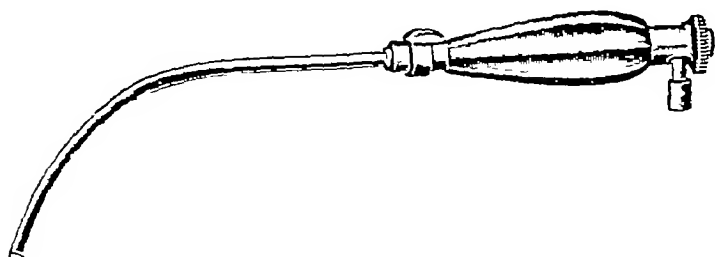


FIG 53
Sucker Nozzle

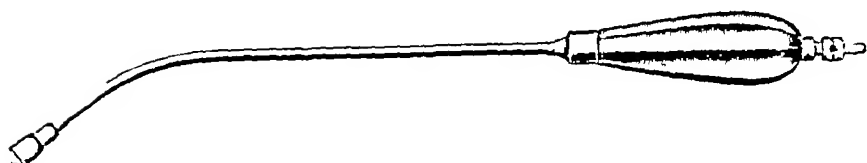


FIG 54
Flexible Lamp

Sucker Nozzle (Fig 53) — This curved nozzle allows the assistant to keep the field constantly dry without being in the operator's way. The push button mechanism allows for the building up of pressure, and so ample suction is obtainable, and the instrument is easily cleaned if it should block with clot.

Flexible Lamp (Fig 54) — Most flexible lamps on the market soon lose their flexibility after repeated boiling. This

model has been so designed that when the flexibility becomes impaired re annealing in a Bunsen flame will not damage the electric wiring. The lamp is also specially constructed so that there is no glare to the operator and the beam is focussed at 5 cms. A cross piece resting on the patient's thighs permits the lamp to remain in position correctly focussed without being held by an assistant.



FIG. 55
Angled Tissue Forceps

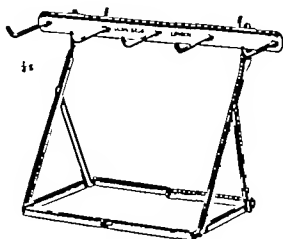


FIG. 56
Ogilvie Instrument Stand.

Harris Catheter—This is a specially constructed hollow-tipped two-eyed catheter of thin rubber allowing a maximal lumen. It is made in 3 sizes 18 20 22F gauge for use according to the urethral calibre.

The angled tissue forceps (Fig 55) are useful for grasping the posterior lip of the bladder neck prior to its wedge resection.

The instrument stand depicted in Fig 56, introduced by Sir Heneage Ogilvie, I have found exceedingly useful and use routinely. Placed on a Mayo table over the patient's legs, it renders the instruments easily accessible to the surgeon and makes for a smooth and rapid operative technique.

CHAPTER IX

RETROPUBIC PROSTATECTOMY

THE OPERATION

WHERE cysto-urethroscopy has not been carried out previously as a diagnostic measure this is performed as a preliminary part of the operation after the patient has been anaesthetised. To save time the lithotomy position is not employed but that shown in the photograph (Fig 57) is



FIG 57

Preliminary Cysto-urethroscopy (The patient's buttocks are usually elevated on a sandbag)

adopted. The author's cysto-urethroscope (Fig 58) is routinely employed which with its wide-angled vision telescope permits a thorough inspection of the bladder for concomitant pathology (Fig 59) and an excellent view of the prostatic urethra to establish the exact confines and dimensions of the obstructing tissue

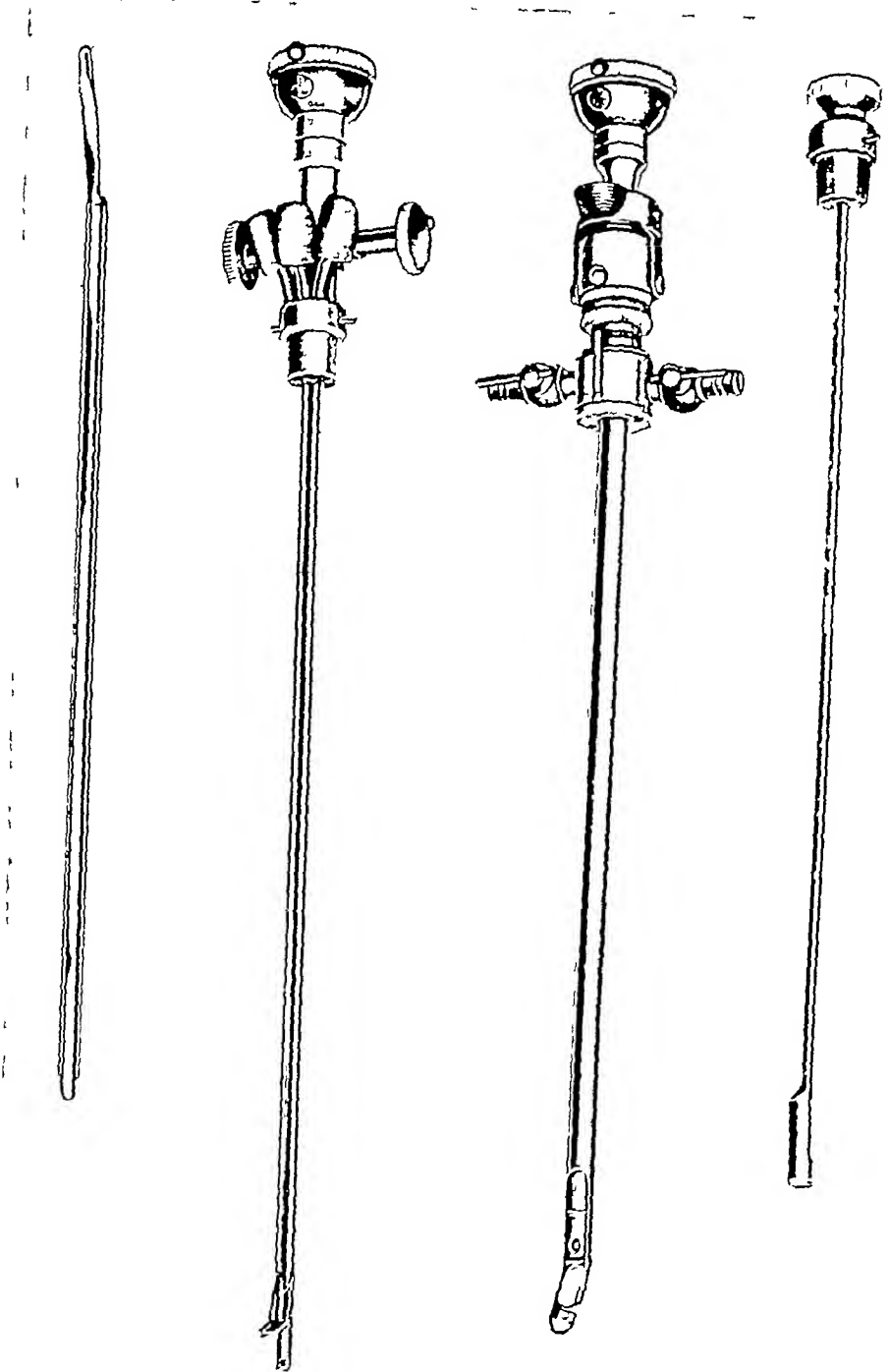


FIG 58

The author's Cysto-urethroscope. The large bore observation telescope is fitted with a new wide angle vision lens giving under water an angle of vision of approximately 75 degrees. Under normal circumstances both ureteric orifices can be seen together in the same field. This new optical system permits an excellent view not only of the entire bladder but also of the posterior urethra. [The instrument was constructed for me by the British Cystoscope Co. Ltd., London.]

Open operation being decided upon the bladder is emptied and the endoscope withdrawn the operator changes his gloves and gown whilst the assistant carries out the necessary additional skin preparation and towels up the patient

A loose towel is then laid over the penis. Where the gland is adenomatous no catheter is passed but when the obstruction is due to a fibrous calculous or carcinomatous gland a No



FIG 59

Mulberry calculus in bladder lying behind posterior commissural hypertrophy as seen cystoscopically

15F rubber Tiemann catheter is introduced into the bladder and spigotted (see Chaps 15 16 17) According to preference either a vertical midline incision $2\frac{1}{2}$ -3 inches long commencing below at the upper border of the pubis, or a similar length transverse section of the skin is made one inch above the pubis. In either event the aponeurosis is incised in the line of the skin section and the Recti muscles separated in the midline. To secure adequate retraction of the Recti when employing the transverse skin incision the upper and

lower leaves of the aponeurosis are separated from the underlying muscles with a few touches of the scalpel. Bleeding points are secured with hæmostats and lightly coagulated, care being taken that no part of the hæmostat is allowed to touch the skin edge lest a troublesome diathermy burn occur. The right index finger is then introduced (the operator standing on the left of the patient) into the lower angle of the wound, and the extravesical fat drawn gently upwards, so

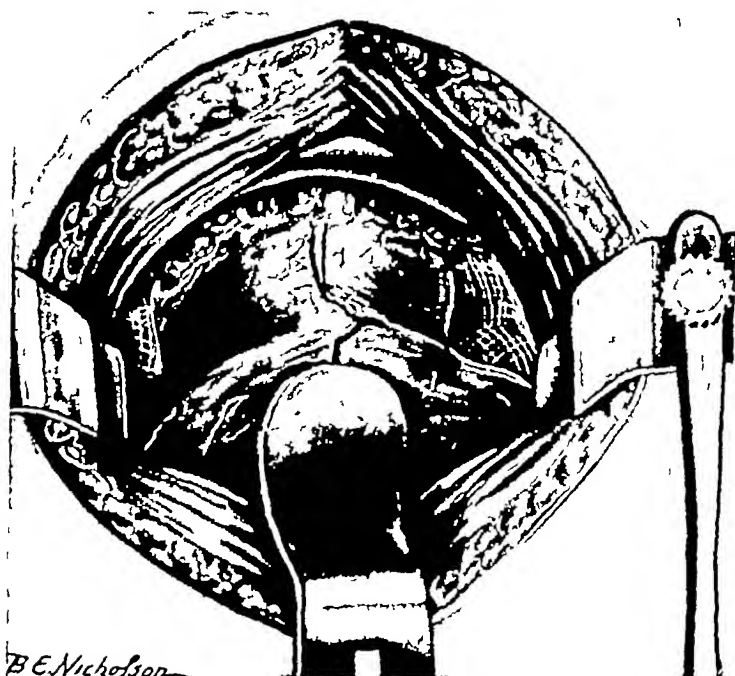


FIG 60

Showing exposure of anterior surface of prostate with superficial vein requiring sectioning. Note packs on either side of the gland and bladder depressed by upper blade of the retractor.

opening up the retropubic space. In some cases the transversalis fascia is a relatively tough structure, and this may require opening with scissors or scalpel before easy introduction of the finger is possible. The author's self-retaining retractor (Fig 47) is now introduced, the lateral blades spreading the Recti. The upper blade is placed suitably in position to depress the empty bladder. Careful inspection of the retropubic space is now made to ascertain the presence of

veins superficial to the prostatic capsule. Such veins, if present must be attended to at this stage or they will be inadvertently torn at a later stage and give rise to troublesome bleeding. They should be seized in hæmostats and divided with scissors. Each hæmostat is then lightly touched with the coagulating current. (These veins are very friable and are not



FIG. 81

Incision of capsule over right lateral lobe of prostate
(sucker omitted for clarity)

easy to ligature). Small swabs mounted on long sponge-holding forceps are now used to clean the anterior aspect of the prostate of adherent fat. Some 12 inches of 4 inch gauze roll are next introduced with long dissecting forceps into each lateral recess depressing the Levatores Ani from the lateral surfaces of the prostate. This packing should be light lest undue pressure be exerted on the Obturator nerves. The Endopelvic Fascia with its contained plexus of veins in close apposition to the true capsule of the prostate is now clearly seen.

Formerly, I used to undermine the central leash of veins and a group on each side with ligatures, but the frequency with which annoying bleeding followed the puncture of adjacent veins of the plexus led me to abandon this step. I now rely on forcipressure after the capsule has been incised.

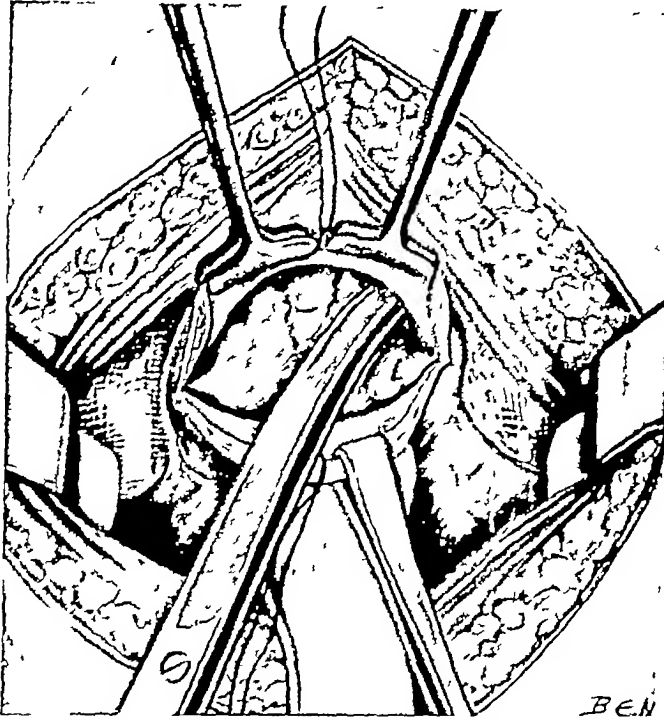


FIG 62

This shows clearly the T shaped capsule forceps and volsellum in position, also the two stay sutures. The lower limits of the lateral lobes are being freed with scissors.

The lateral spread of the prostatic enlargement is carefully palpated to estimate the size of the lateral lobes (not truly assessable by endoscopy), and attention is next directed to the region of the bladder neck. The transverse disposition of the veins reveals the position of this area, and palpation with the index finger will indicate the abrupt ending of the resistance of the firm gland giving way to the elastic bladder wall.

The gland having been thoroughly exposed and its confines fully demonstrated, the capsule is next incised in the following manner. Using long-handled scalpel (e.g., No 10

Bard Parker blade mounted on a No 7 handle),¹ a transverse incision slightly convex downwards is made over the right lateral lobe one centimetre below the bladder neck through both capsules until the white adenoma is clearly seen. This incision is accompanied by considerable venous bleeding and it is highly desirable to have adequate suction at this stage (Fig 61). The assistant should direct the nozzle of the sucker against the line of section so that clear visibility is maintained. When the adenoma has been visualised the under flap is quickly undermined either with scalpel or long scissors curved on the flat and the first pair of T capsule forceps applied. These forceps control the bleeding from the cut capsule. A similar incision of the capsules overlying the left lateral lobe is next made, linking up with that over the right lobe, the lower flap undermined and a second pair of capsule forceps applied (Fig 62).

A small artery is not infrequently seen spurting from the cut edge of the upper capsular flap in or about the middle line. This if present is seized with a hemostat and coagulated. The edge of the upper flap is now lifted from the underlying adenoma using the special toothed volsellum a few snips with the scissors aiding the process. It is convenient now to pass a stay suture of No 1 catgut through each flap in the midline. A small boomerang needle is best for this purpose the ends of the sutures are left long and held in hemostats. Any bleeding points in the cut capsular margins not caught by the T forceps are dealt with by hemostat and diathermic coagulation. (It will be noted from the above description that no attempt is now made to differentiate between the true and false capsule as originally practised this step was not always easy and has proved to be unnecessary). The lower limits of the lateral lobes are now defined and freed distally and laterally using the long scissors curved on the flat as depicted in Fig 62.

When this has been accomplished the anterior wall of the

1 The scalpel seems preferable to the endothermy knife for several reasons. It gives a sense of touch enabling the operator to feel when he has reached the adenoma. Moreover for the endothermy knife to exercise a hemostatic action here a strong coagulating current is required which must lead to devitalisation of tissue and so to slower healing of the line of incision.

urethra is cut across deliberately as far proximally as possible, still using the scissors. This manœuvre will prevent accidental avulsion of an undue amount of urethral mucosa close to the apex of the gland, it being well known that any encroachment on the membranous portion of the canal may be followed by a temporary or even permanent incontinence. The above mentioned scissor dissection should have freed the lateral

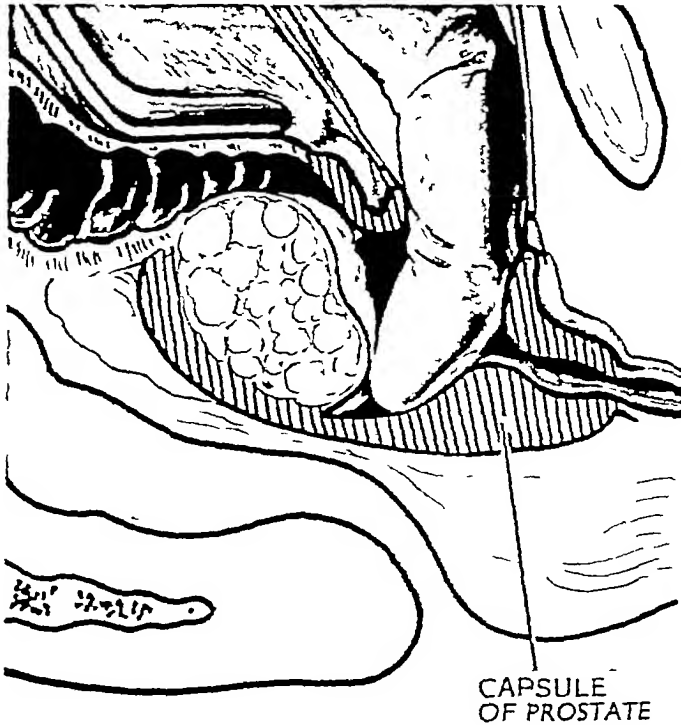


FIG 63

Shows method of enucleation of adenoma from below upwards

lobes very largely, distally and on either side, and the stage is set for the completion of the enucleation by means of the finger. The capsule forceps and volsellum are now removed and the retractor withdrawn. By drawing on the inferior stay suture with the left hand the lower capsular flap is elevated and the right index finger easily finds the right plane of cleavage between the adenomatous mass and the overlying capsule. It is hooked round the lower limits of the lateral lobes, and each is freed in turn from the posterior aspect of

the capsule (Fig 63) When this has been accomplished the mass is turned forwards and freed from the under aspect of the trigone (Fig 64) It is now adherent merely at the bladder neck and may be delivered up into the wound



FIG 64

This shows the left lateral lobe freed and turned out of the capsule whilst the right lobe is being delivered (This stage is not usually visualised during the operation)

A small retractor is now introduced at the upper angle of the wound by the assistant and the upper stay suture drawn upon This manœuvre reveals the circular muscle fibres at the bladder neck which are peeled upwards using the closed scissors until the adenomatous mass is held merely by a cuff of mucosa This is then sectioned with scissors and the mass removed (Figs 65 66)

A temporary pack is now placed in the prostatic cavity to control the bleeding The self retaining retractor is replaced the upper blade being dispensed with as unnecessary at this stage By elevating the stay sutures, the capsular incision is

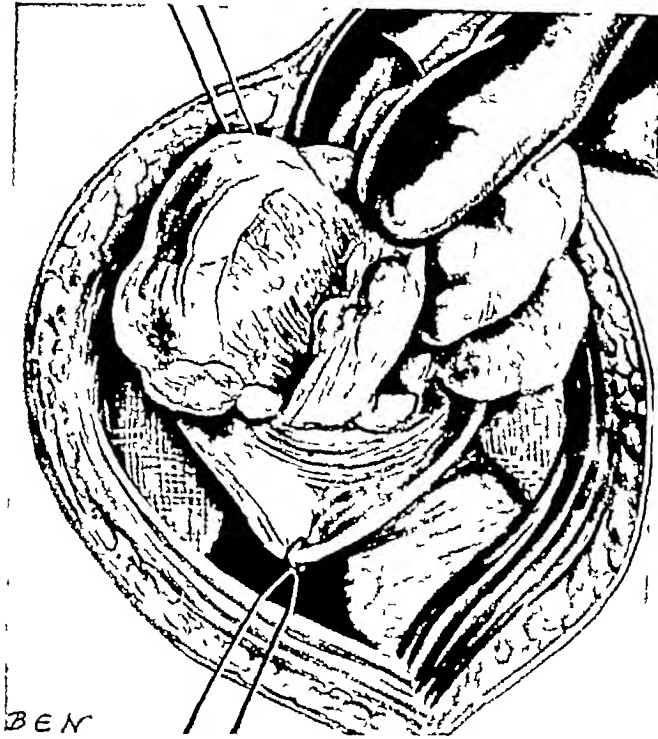


FIG. 65

This shows the circular muscle fibres at the bladder neck and the mucosal cuff, before sectioning



FIG. 66

This photograph taken during an operation shows well the lengthy mucosal cuff obtainable in some cases. Note the small lobule proximal to the main adenomatous mass

drawn open revealing the prostatic cavity. The gauze packing is withdrawn. With the flexible lamp in position and the sucker nozzle directed into the cavity careful inspection is

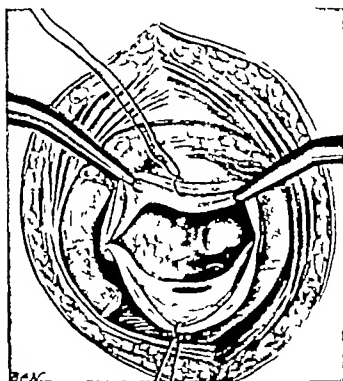
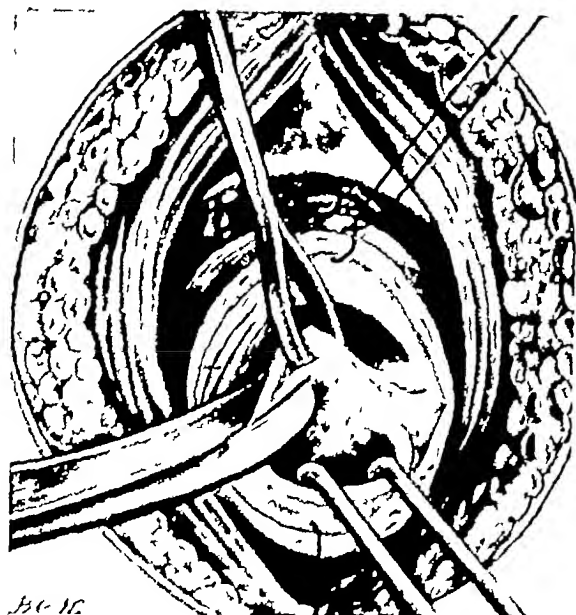


FIG. 67

Inspection of prostatic cavity after enucleation. In addition to the stay sutures two Kocher forceps have been placed on the inferior flap. Note small adenoma left on the right side. This will be removed with scissors.

made to ensure that no small adenomata have been left. When such are noted as shown in Fig. 67 they are removed with scissors. Loose tags of false capsule are similarly removed.

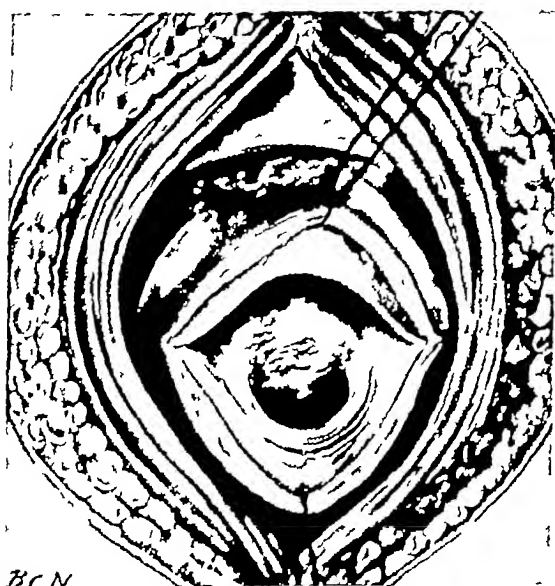
The cavity should be left perfectly smooth. Attention is next directed to spurting vessels which are caught in long Kocher's forceps and coagulated. Not infrequently the prostatic arteries are seen bleeding on each side about 1 cm. below the bladder neck and should be dealt with. More frequently in our experience the arterial branching has taken place earlier and no main trunk is seen. When the principal bleeding has been controlled a small swab is again placed in the prostatic cavity whilst the vesical neck is inspected and



B.C.N.

FIG. 68

Shows method of grasping posterior lip prior
to sectioning by scissors



B.C.N.

FIG. 69

Shows appearance of vesical neck after
excision of wedge

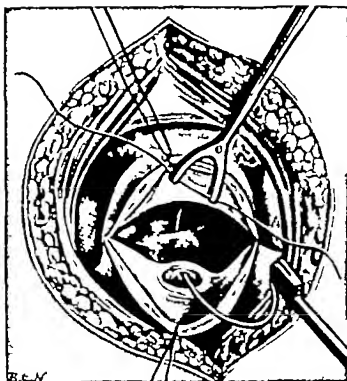


FIG 70

Shows method of introducing Boomerang needle through vesical neck and emerging through capsule $1\frac{1}{2}$ cms below



FIG 71

The suture has now been tied pinning down vesical neck. The catheter is emerging into the prostatic cavity and the spreader is holding open the bladder neck

palpated. This is best done by utilising the special "spreader" (Fig 53), which the assistant introduces into the neck, enabling him to draw the anterior lip forwards and upwards, so revealing the posterior lip. By opening the "spreader" the sphincter is stretched, and an index finger may be introduced within the bladder to palpate the trigone and base. Small stones previously noted may be easily scooped out. It is now my practice to excise a generous wedge from the posterior lip of the vesical neck, as shown in Figs 68 and 69.

An alternative procedure to this cuneiform resection of the bladder neck is to pin down the posterior lip by means of a stitch introduced with the Boomerang needle as in the Harris technique (Figs 70, 71).

After having given each method a trial I now prefer the cuneiform resection to the Harris type of stitch. My reason is that the only late secondary hæmorrhage I have met with to date (14th day) was in a case in which the stitch method was employed, and I had experienced several such examples of 14th day secondary hæmorrhage whilst using the Harris operation, believed to be due to a retraction of the trigone flap when the catgut is absorbed.

The swab is next extracted from the prostatic cavity, a suitable sized thin-walled hollow-tipped rubber catheter mounted on a stilet and well lubricated passed along the urethra until the tip is seen in the prostatic bed. The stilet is now withdrawn, and the tip of the catheter guided on into the interior of the bladder, the manoeuvre being helped by the assistant holding open the vesical neck with the "spreader". The size of catheter is chosen according to the calibre of the urethra, 18, 20, or 22F being used. Various types of catheters have been employed, including the Foley, but we prefer the type above mentioned.

The catheter being suitably adjusted, and obvious bleeding being controlled (Fig 72), the lateral packs are removed and the capsular incision is now closed transversely in the line of the original section, using No. 1 chromicised catgut and the Boomerang needle. It is convenient to commence

the continuous suture on the side on which the operator is working i.e. the left. (Fig 73)

It is all important to secure accurate apposition of the incised capsular edges to control bleeding and to minimise the possibility of urinary leakage when micturition is re-established.



FIG 72

Shows catheter traversing prostatic bed and eyes suitably placed within bladder

lished. During the suturing process good visualisation is essential and the field must be kept free from blood by means of the sucker. Care must be taken to avoid picking up the bladder wall with the stitch—the upper leaf of the capsule retracts and is sometimes obscured by the anterior wall of the bladder. When the capsular suture has been completed all bleeding will usually have been controlled. The retropubic space is now gently swabbed free of any loose clots and carefully inspected to ensure that all oozing has been controlled. The area is dusted with 5 grams of Proflavine-sulphanila-

mide powder. A small corrugated drain is left down to the suture line, and the Rectus sheath closed with interrupted sutures of No. 1 chromicised catgut. The skin is closed with interrupted silkworm sutures and Michel clips.

(In two cases where satisfactory control of the venous ooze

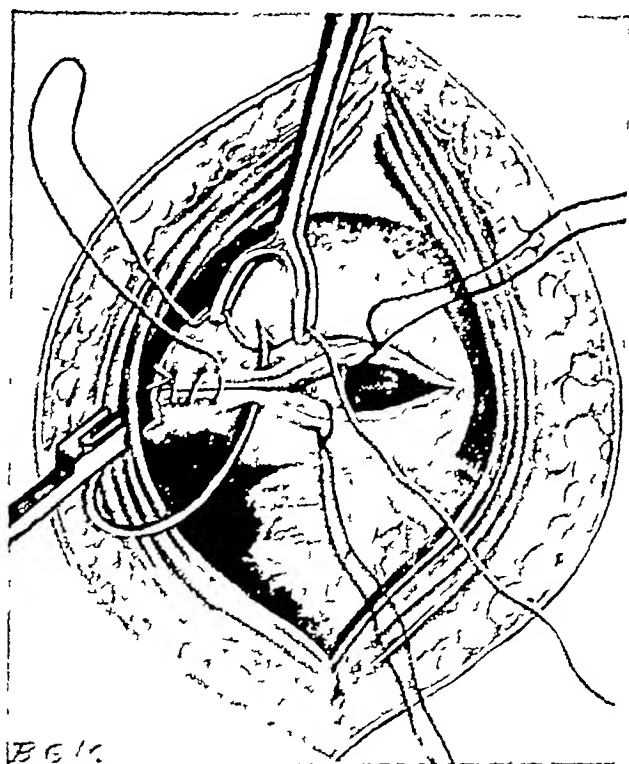


FIG 73

Shows the continuous suture of the capsule being checked

had not been secured, a light gauze pack was placed in the retropubic space in apposition to the capsular suture line. The pack was eased out partially 24 hours later, and completely removed in 48 hours. In a third case a light dressing of Oxygel was sutured to the capsular incision, this synthetic pack has the merit that it is absorbable and so removal is unnecessary.

Bilateral vasectomy is carried out routinely, and the catheter irrigated with 3.8 per cent Sodium Citrate solution to free it of any clots collected during its passage through the

prostatic cavity. Four ounces of the lotion are left in the bladder and the catheter spigotted. The catheter is fixed to the skin of the penis by means of a silkworm gut stitch. (We prefer this simple method to any form of internal suture.) The catheter fixation is reinforced by two narrow strips of adhesive strapping applied as shown in Fig 74. No circular strapping is applied to the penis lest a damming up of urethral discharge occur and predispose to peri urethral abscess. It is noteworthy that no instance of this has occurred in this series.

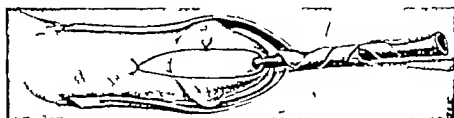


FIG 74

Method of catheter fixation employed at conclusion of operation

Where vesical calculi require removal after the adenoma has been enucleated, the toilet of the bed completed and the wedge resection of the posterior lip effected the bladder neck is opened by means of the spreader the interior of the organ visualised and the stones removed with appropriate forceps. Digital exploration then confirms complete removal.

EMERGENCY PROSTATECTOMY FOR HÆMORRHAGE

On two occasions in recent years I have been forced to carry out an emergency prostatectomy for profuse prostatic hæmorrhage following a suprapubic cystostomy. The following report illustrates one such —

W.F. æt 73 with a history of prostatism over many years. Admitted to provincial hospital with clot retention. Emergency suprapubic cystostomy and immediate blood transfusion. Profuse hæmorrhage continued and despite continuous intravenous blood over four days (11 pints in all) the patient's

condition was rapidly deteriorating. On the fourth post-operative day an emergency Freyer enucleation was decided upon and carried out. A very large intravesical type of gland, ulcerated on the surface, was removed. The bleeding promptly subsided and after a stormy convalescence the patient made an excellent recovery.

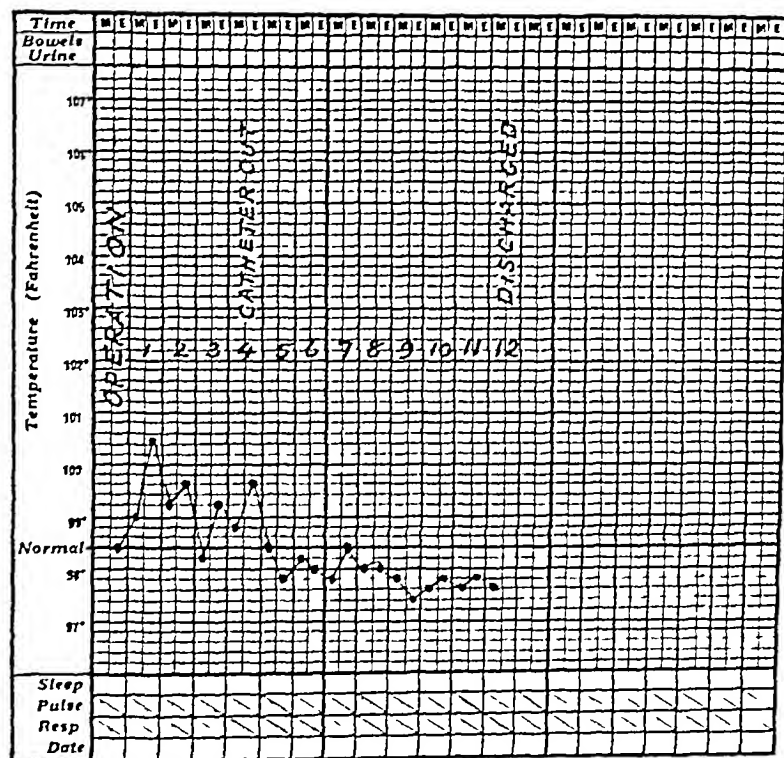


FIG 75
Temperature Chart

Such a case indicates that bleeding from a massive intravesical type of prostate may call for an immediate prostatectomy rather than the commonly employed suprapubic cystostomy. The following case illustrates well the value of this procedure carried out by the retropubic approach.

N.R., æt 68, complained of prostatic symptoms for some years; sudden profuse hæmaturia leading to clot retention, seen in consultation in provincial Nursing Home, bladder tautly distended to umbilicus, prostate large on rectal examination. Aspiration through cystoscope sheath evacuated

many of the clots and allowed a rapid inspection of the bladder to rule out associated vesical neoplasm. The ureteric orifices could not be visualised owing to the presence of a very large intravesical sub-cervical lobe. Active bleeding continued from the prostate. Under anaesthesia with the bladder empty careful palpation of the kidneys was made but no evidence of tumour could be made out. (An emergency retropubic prostatectomy was performed in twenty minutes digital exploration of the bladder being made through the vesical neck and the remaining clots evacuated.) The patient made an uneventful recovery and left the Nursing Home on the twelfth post-operative day soundly healed (Fig 75).

The circumstances here demanded prompt measures. No time nor indeed facilities for renal investigation existed. Should subsequent intravenous urograms have shown evidence of renal neoplasm this could have been dealt with later. The retention was the prime consideration.

after the transvesical operations. An aperient is administered on the second evening my personal preference being Pil Alophen 2 3 preceded by one or two doses of Liq Paraffin $\frac{1}{2}$ oz. The patient is allowed out of bed to use the commode the following morning so avoiding that abomination of every patient—the bed pan. The corrugated drain is shortened by one inch on the second day and removed on the third day

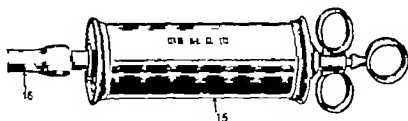


FIG 77
Large bore nozzle metal aspirating syringe

Careful watch is, of course maintained on the abdominal dressings during the first 12 hours for evidence of excessive bleeding. As a general rule these need only be changed every 12 hours.

The urinary drainage is usually heavily blood stained for 24-36 hours gradually lightening in colour. In the average case the drainage resembles Burgundy the day succeeding operation, Vin Rosé the following day and on the third morning Sherry.

We formerly maintained catheter drainage for 6-7 days but in the majority of our last 200 cases have been removing the catheter on the third day. Despite this early removal only a small proportion leak suprapubically. When this does occur to any appreciable extent the catheter is replaced for a further 4-5 days.

There is rarely difficulty in micturating on withdrawal of the catheter. Some minor discomfort may be noticed at first particularly on initiating the act. In very nervous patients the pain may be marked enough to cause a reflex spasm with consequent retention. A hypodermic of morphia may be adequate to check the spasm and allow urination. If not, a catheter is passed and left in place for a further 36-48 hours. As mentioned above early rising from bed is encouraged unless

contra-indicated and the patient gets up for increasing periods each day

Sulpha therapy is administered routinely in small doses, e.g., Sulphathiazole $\frac{1}{2}$ gram every 6 hours. This dosage is increased if infective phenomena occur. Latterly we have been giving Penicillin 100,000 units pre-operatively and continued every eight hours for 4-5 days. It would appear to be helpful but useful deductions cannot yet be drawn.

In most cases a short walk is allowed on the tenth post-operative day and the patient is dismissed on the 14th-16th day. Cystopurin, tabs 2, t d s for three weeks, is prescribed.

All cases where possible are seen 3-4 weeks after leaving hospital, the force of the urinary stream and the macroscopic appearance of the urine being noted. Not infrequently the urine is macroscopically clear at this visit but is usually faintly hazy, it is the rare exception to find a gross pyuria, unless a heavy pre-operative infection has been present. Should the urinary stream not appear adequate, bougies are passed, but since adopting the routine wedge excision of the bladder neck no stricturing in this region has been met with. Patients living at a great distance who find this visit to the surgeon a hardship are advised to visit their doctor who reports his findings.

The measures adopted for the various post-operative complications met with are described in Chapter 13.

The following brief case reports will indicate the results obtainable by the retropubic approach:—

J.M. æt 57, prostatic symptoms for upwards of two years; recently difficulty of urination and frequency D/N ++/1; large adenomatous gland on rectal examination, bladder just palpable above pubis, Blood Urea 37 mgms per cent.

20.11.45. Retropubic enucleation of large bilobed adenomatous prostate; bilateral vasectomy

21.11.45. Urine free of blood

23.11.45. Allowed out of bed

26.11.45. Catheter out, free micturition

28.11.45. Shown to members of Section of Urology of Royal Society of Medicine

L O , æt 64 , prostatic symptoms for some years culminating in acute retention , indwelling catheter 36 hours Blood Urea 44 mgms per cent moderate sized prostate on rectal examination

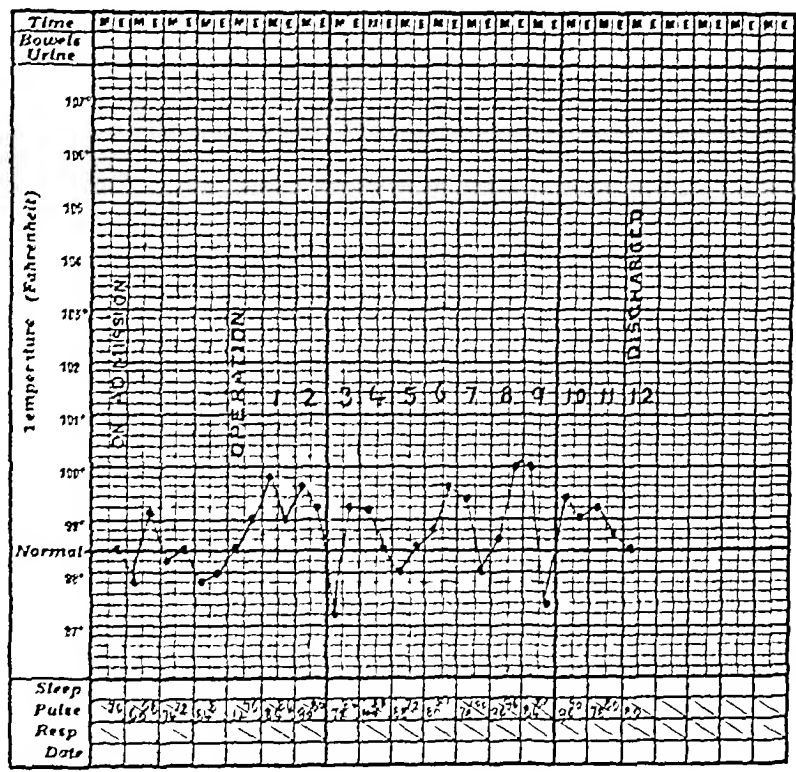
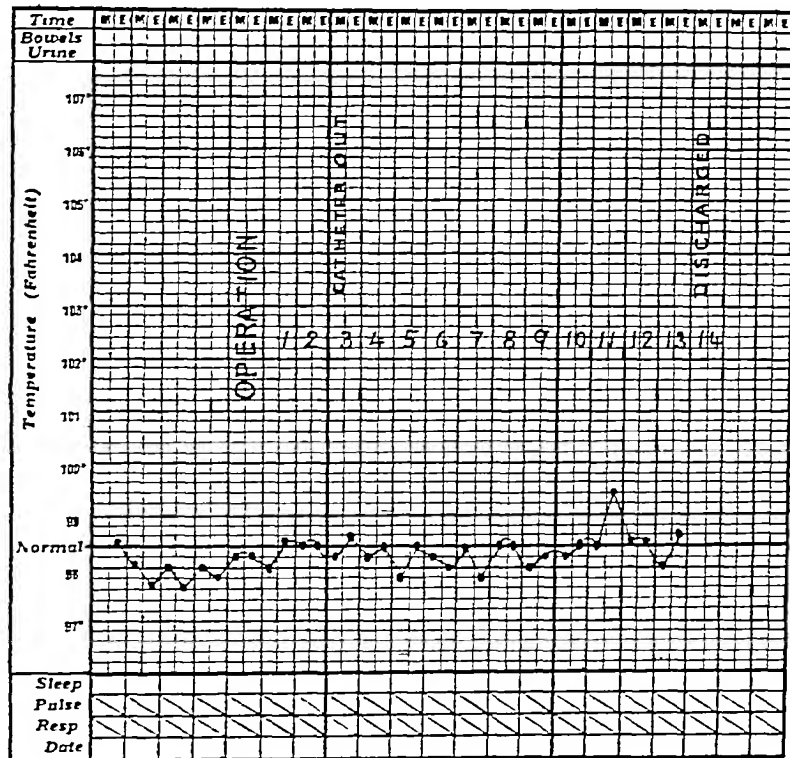


Fig 79
Temperature Chart

- 29 9 45 Retropubic Prostatectomy (tri-lobed gland).
- 1.10.45. Catheter removed , free micturition
- 9 10 45 Out for drive
- 13.10.45 Discharged
- 25 2 46. S=good F=D/N=normal/I

F C , æt 80 ; prostatic symptoms for some years culmina-
ting in acute retention , catheter drainage 10 days

Clinical examination revealed poor general condition ,
marked Heart Block , very large benign prostate on rectal
examination , Blood Urea 70 mgms per cent



30.12 45 Retropubic Prostatectomy under abdominal wall
block, 0 25 gm Pentothal and Gas-Oxygen

6.1 46. Catheter withdrawn, micturating well

14 1.46. Discharged

The following illustrate some characteristic temperature
charts —

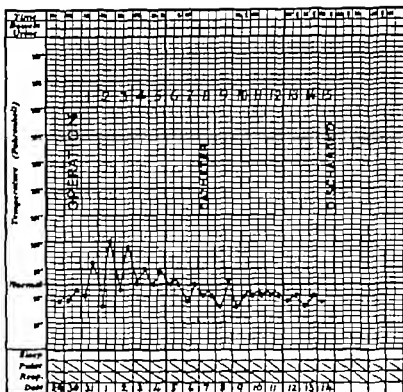


FIG 82
Temperature Chart.

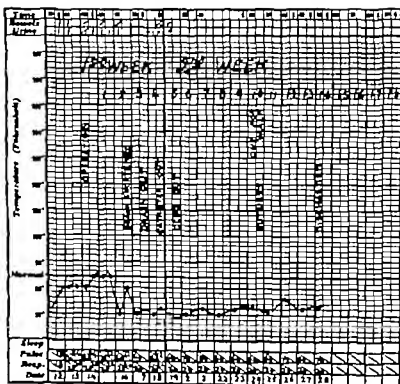


FIG 83
Temperature Chart.

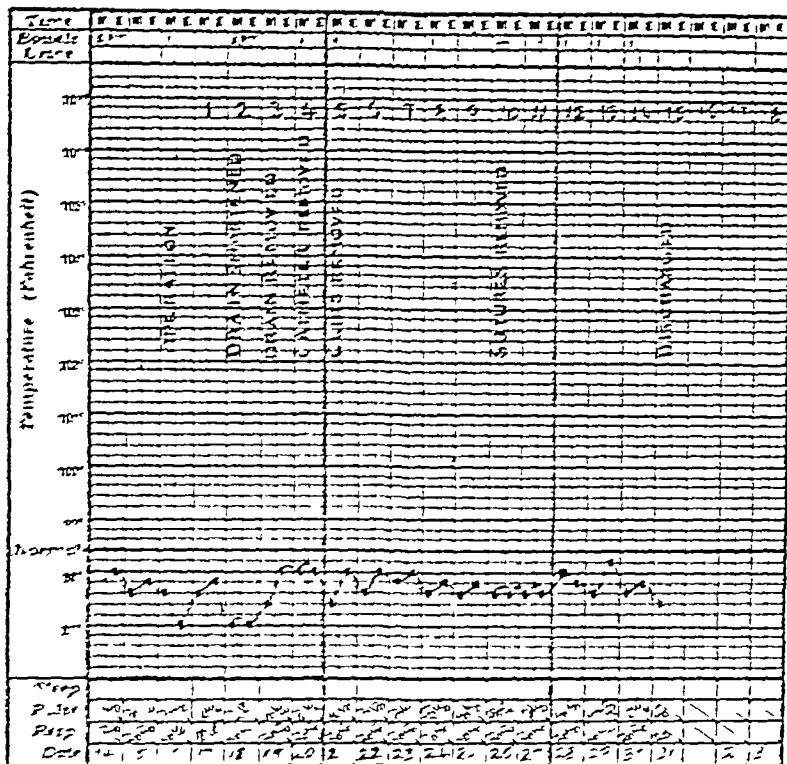


FIG. 84.
Temperature Chart

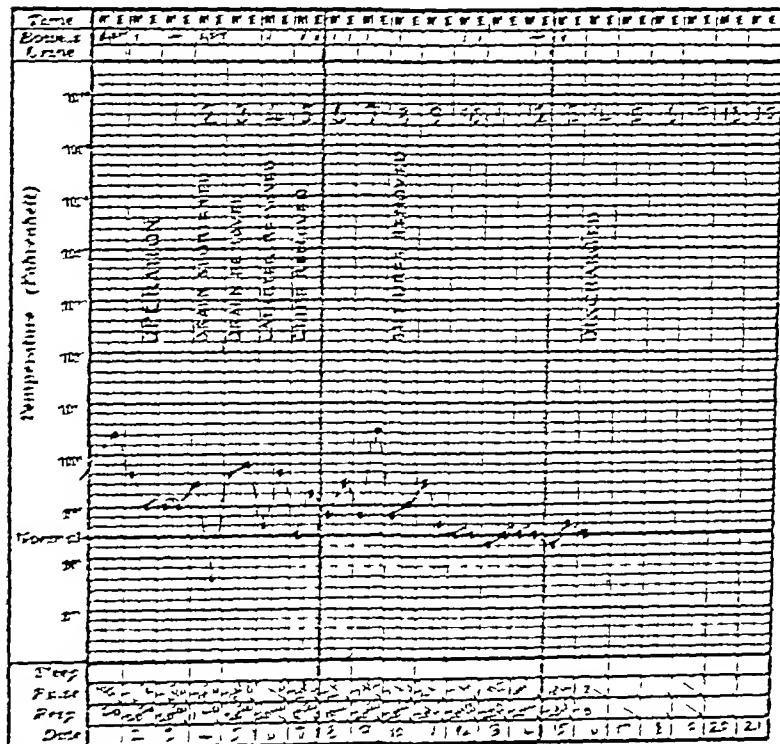


FIG. 85
Temperature Chart

CHAPTER XI

RETROPUBIC PROSTATECTOMY AFTER PRELIMINARY CYSTOSTOMY

SOME surgeons, who have adopted the retropubic operation for all cases in which a one-stage procedure seems warranted, still favour the simpler and more rapid Freyer technique when a preliminary suprapubic drainage of the bladder has been necessary. It is true that the intravesical enucleation can be effected more expeditiously¹ than the retropubic procedure, but my personal view is that the extra ten or fifteen minutes on the operating table are well spent when measured in terms of total blood loss, easy convalescence and rapid dismissal from hospital.

THE OPERATION

This is carried out after every effort has been made to diminish urinary infection by means of vesical lavage and appropriate sulpha therapy (Latterly Penicillin has also been employed where the infecting organisms are Staphylococci or other sensitive microbes)

When the patient has been anæsthetised, the suprapubic tube is removed, the operative field antiseptically disinfected and towelled up. A gauze swab is packed into the suprapubic fistula.

A transverse skin incision, three inches long, is now made immediately above the pubis (Where the preliminary cystostomy has been established adjacent to the bone, the skin incision may actually be below the upper border of the pubis) The incision is deepened through the aponeurosis and the two leaves of the latter freed with a few touches of the

scalpel from the underlying muscle. The Recti are next separated as in the routine one stage procedure. Not infrequently the linea alba and subjacent fibrous tissue require sectioning before the muscles separate. Rarely it is desirable to incise the inner borders of the Recti tendons. With the index finger the retropubic space is opened up and the empty bladder depressed gently. In no instance have I experienced any difficulty in effecting excellent exposure of the prostate. The remainder of the operation is conducted exactly as though no suprapubic fistula were present. The skin incision closed attention is directed to the cystostomy opening. Where this has been performed months before the track will generally be completely epithelialised. It is necessary in such cases to cone out the mucosal lining as depicted in Figs 87 88 89

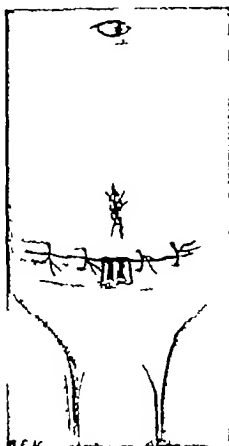


FIG 87

Second-stage Retropubic Prostatotomy. Dotted line shows line of incision of fistula.

using a fine-bladed scalpel. When the fistula is not long standing and lined only with granulation tissue it is adequate to curette this gently. After either procedure a gauze plug is placed in the fistula and maintained for 48 hours. (Where desired of course a suprapubic catheter can be replaced for two or three days but the fistula will be correspondingly slower in closing.) Catheter drainage is maintained for eight days by which time the fistula will usually be sufficiently soundly healed to allow urination without leakage. Should leakage occur the catheter is replaced for a further few days.

The following case illustrates the satisfactory course

which may be expected from a **Two-stage Retropubic Prostatectomy** :—

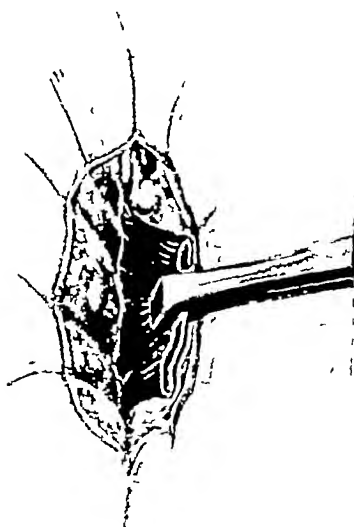


FIG 88

Second-stage Retropubic Prostatectomy "Coning out" of epithelialised track to bladder

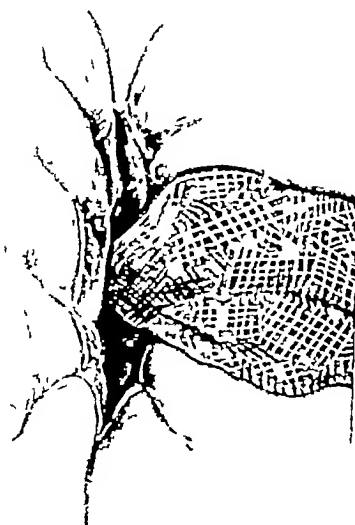


FIG 89

Second-stage Retropubic Prostatectomy Gauze pack placed in track

A J M , æt 71 History of marked prostatism for more than 2 years , poor stream, F-D/N 2-hourly/4-5 , acute retention 2 days before admission , indwelling catheter not tolerated

- 25 7 46 **Suprapubic Cystostomy**, and bilateral vasectomy
- 6 8 46 **Second-stage Retropubic Prostatectomy** (very large gland)
- 9 8 46 Catheter removed , voided well without leakage
- 18 8 46 Discharged home soundly healed

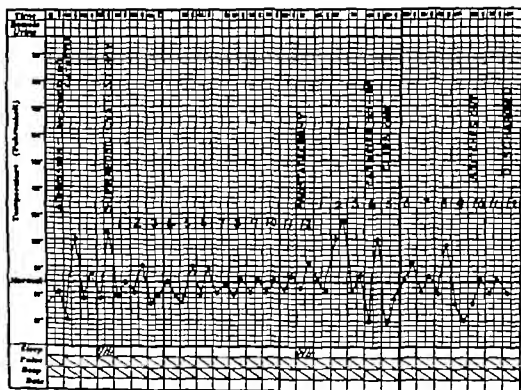


FIG 90

Temperature Chart

ANALYSIS OF 18 CASES OF SECOND-STAGE RETROPUBIC PROSTATECTOMY

Case	Name	Age	Reason for Cystostomy	Duration of Cystostomy	Blood Urea	Post-operative stay in hospital	Remarks
1	L B	77	Chronic Retention	4 months	37	15 days	
2	B L	69	Acute Retention	6 months	46	27 days	
3	W J D	68	Acute Retention	3 months	41	16 days	
4	J M	64	Acute Retention intolerant of catheter	2 weeks	39	20 days	
5	G H G	71	Chronic Retention	12 months	42	15 days	Advanced Parkinsonism Stones in bladder
6	A C P	75	Chronic Retention	2 months	38	21 days	
7	W G	65	Chronic Retention	5 months	46	30 days	Detained for chest condition
8	J R	76	Acute Retention poor state	5 weeks	72	36 days	Detained for asthenia, lived remotely
9	J S L	67	Chronic Retention Infection	4 months	54	18 days	Calculus prostate
10	E H	69	Chronic Retention Uræmia	12 months	33	29 days	Detained for asthenia following jaundice due to blood transfusion incompatibility
11	H H	66	Large vesical stone Gross infection	3 weeks	40	29 days	Gross infection due to 2 years' self-catheterisation
12	D E K	68	Acute Retention Fibrillating	3 months	36	22 days	
13	H B	75	Chronic Retention	8 months	47	Died 6th day	Cardiac Failure
14	H C A	74	Chronic Retention	4 years	34	37 days	Suprapubic fistula slow in closing
15	E C	76	Chronic Retention	5 months	36	22 days	
16	A J M	71	Acute Retention intolerant to catheter	2 weeks	40	12 days	
17	E G	67	Chronic Retention	2 weeks	39	15 days	
18	J S	69	Chronic Retention	4 months	64	18 days	

In addition to these 18 cases operated upon in the presence of a suprapubic cystostomy there were three others who had previously undergone a suprapubic bladder operation but whose fistula was closed at the time of the retropubic prostatectomy. In none was there any difficulty in exposing the prostate.

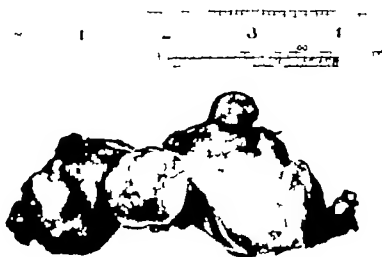


FIG 91

116 gm tri lobed prostate removed four years after
transurethral resection

The following case is illustrative —
A G L. aet. 66 a medical man who had undergone 4 years previously a transurethral resection elsewhere after a preliminary cystostomy. His urinary symptoms rapidly returned and I removed the 116 gramme tri lobed gland shown in Fig 91. He left hospital soundly healed on the 15th post-operative day.

CHAPTER XII

OPERATIVE DIFFICULTIES

HÆMORRHAGE.—It has frequently been alleged that the hæmorrhage during the retropubic operation is alarming and that much time has to be spent in controlling this. I can but say that I have not found it so, but meticulous attention to detail is essential. In a series in which accurate blood loss estimations were made the average was 200 c cs. In one case the loss was less than 60 c cs. The use of the T-shaped capsule forceps has been invaluable for hæmostasis of the capsular veins.

Obesity.—Apart from the fact that the obese subject is seldom an ideal surgical risk, mere bulk offers certain technical difficulties. It is well known that the classical Freyer prostatectomy in a very stout man may be exceedingly difficult, particularly as a second stage procedure, owing to the depth from the surface and difficulty of access. I have known an internationally celebrated surgeon send for a colleague with a longer index finger to help him enucleate a prostate which had eluded his reach¹. Similarly in the perineal operation the distance from the surface in the stout patient adds considerably to the operative difficulties. In the retropubic approach, mere obesity adds little to the technical difficulties, provided that a retractor with sufficiently deep blades is to hand and that the skin incision is sufficiently ample to allow the upper border of the pubis to be laid bare. The distance from the summit of the pubis to the bladder neck varies but little and even in the stoutest the prostate is readily accessible to the shortest fingered surgeon. More extensive gauze dissection is required to free the retropubic space of the excess fat and more veins may need to be sectioned and coagulated.

Bony Deformities.—A large chondroma arising from the posterior aspect of the pubis would conceivably prove an

impassable barrier to the retropubic approach but I have never met any such impediment. An old mal-united fractured pelvis might also prove a contra indication

Colostomy—The presence of a colostomy affords no more difficulty than it does to the classical transvesical approach rather less so indeed in that the incision may be kept at a lower level and so farther away from the site of potential infection. I have had to deal with one such case and primary union of the wound occurred

Irreducible Scrotal Hernia.—This if of large dimensions can prove troublesome in the retropubic operation. By virtue of its size and position it obscures good exposure of the prostate but it has not to date rendered any prostatectomy impossible

Abnormal Arteries—The three commonest anomalies have already been described (Figs 23 24 25) and discussed and provided that the operator is aware of their possible presence, he should find no difficulty in dealing with the situation. If they are likely to be damaged during the later part of the operation they should be divided between hæmostats and coagulated. Were their existence not appreciated very troublesome bleeding could occur and I have heard of one case in which I surmise that such did in fact happen. Good exposure and adequate visualisation throughout the operation are essential.

Loss of Prostatic Lobe in the Bladder—Following enucleation on one occasion a discrete glandular lobe made its way through the vesical neck into the interior of the bladder. The following manœuvre rendered its recovery an easy matter. Whilst the assistant held open the vesical neck by means of the spreader the errant lobe was readily visualised and lifted out with sponge holding forceps. A colleague has told me of a similar occurrence in which considerable time was spent blindly fishing for the lost lobe within the bladder

CHAPTER XIII

POST-OPERATIVE COMPLICATIONS

THE following notes are based not only on personal observations and experiences but on reports from other surgeons who have employed the technique

HÆMORRHAGE

Reactionary.—Only one case of consequential intra-vesical reactionary hæmorrhage has been met with in over 375 cases. This patient aged 71 had suffered from cardiac incompetence for many years and for seven years prior to operation had been unable to walk upstairs or to indulge in any but the mildest exercise. His immediate post-operative condition was excellent but some 6 hours later it was apparent that bleeding was excessive. A blood transfusion and further intravenous therapy were administered but the severely damaged myocardium was unable to compensate with even a relatively small loss of blood and he succumbed from cardiac failure within 48 hours.

With the adequate exposure of the prostatic cavity obtainable during the operation and the consequent accurate visualisation of the bleeding points, control of hæmorrhage should be secured on the operating table and cases of clot retention due to reactionary bleeding are the result of faulty hæmostasis before or during capsular closure or of negligence in the post-operative care of the catheter.

In one case of marked hypertension (240/160) operated upon by one of my assistants excessive suprapubic blood loss led to his re-opening the wound 8 hours later, finding the bleeding vessel in the capsule and underrunning it with a stitch. The patient made an excellent recovery and was discharged from Hospital 27 days later. In only one personal

case was such intervention required. This patient was also an advanced hypertensive (B P 260/150). The same evening the House Surgeon re-opened the wound and secured hæmostasis by packing the retropubic space. The packing was removed 48 hours later.

Secondary—No operation yet devised for the relief of prostatic obstruction is free from this possible complication. A raw area is inevitably left, potential or actual infection is present and the scene is laid for a secondary hæmorrhage. I can state categorically that I have had a much lower incidence of this complication since employing the retropubic approach than I did whilst using any other route. In no case have I or any of my assistants had to perform a suprapubic cystostomy for hæmorrhage, reactionary or secondary. In a small number of cases the passage of a 24F gum-elastic catheter and aspiration of clots was necessary. The catheter was left in situ until the urine was again clear. The sixth post-operative day has proved the commonest for this complication. Should a severe secondary hæmorrhage occur it is all important to take constant blood pressure readings lest the systolic pressure falls sufficiently low to minimise the renal blood flow and so lead to dangerously low urinary excretion. Elevation of the foot of the bed, hypodermics of Morphine and blood transfusions to maintain systolic blood pressure and to aid coagulating time are indicated. Any evidence of bright blood per urethram calls for prompt measures: a catheter should be passed and left in situ for 48 hours.

URO SEPSIS

Where urinary infection has been controlled before operation uro-sepsis is seldom of consequence after the retropubic operation. The pre and post-operative use of the Sulphonamides combined in some cases with Penicillin¹ have proved a great advance and it is our experience that the urine clears much more rapidly than after any other intervention we have employed. The urine is inspected each morning and evening and where an undue haziness is noted particularly about the

¹ POWELL R. WOOD (1946) *Lancet* 2, 32

tenth post-operative day a further course of Sulpha drug therapy may be indicated. In general we employ Hexamine for 3 weeks after the tenth day.

From time to time an uncontrollable urinary infection will occur after any surgery of the prostate and despite full courses of Sulphonamide therapy, Penicillin, etc., will progress to a fatal Pyelonephritis. We have had three such cases.

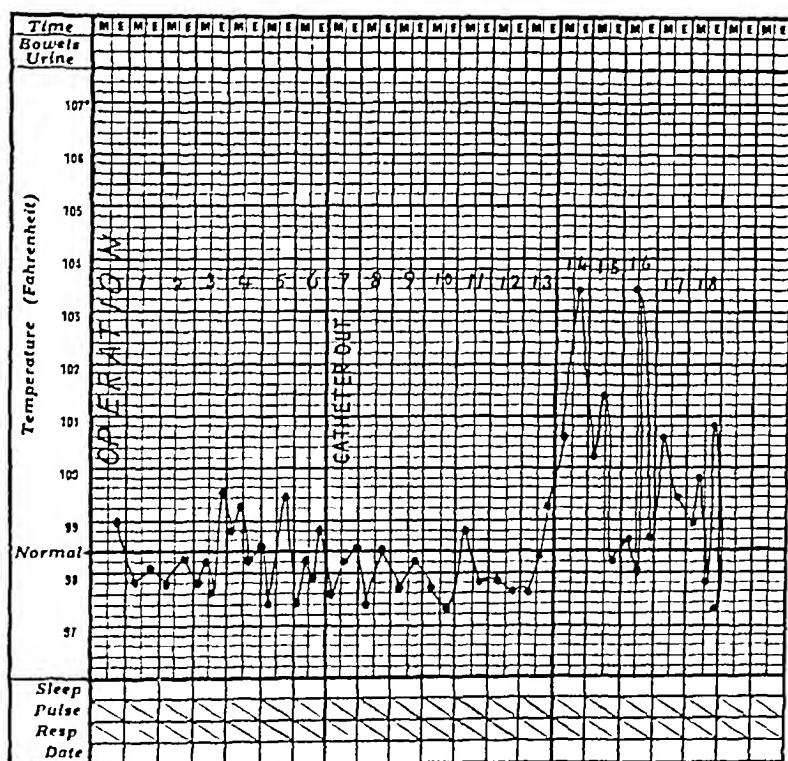


FIG 92

Temperature Chart

The following case is illustrative of such a train of events –

Dr T, æt 76, suffered from prostatic symptoms for many years, acute pyelonephritis followed an attack of retention, indwelling catheter and sulpha therapy led to remission of fever and apparent clearing of urine though the latter was still harbouring Coliform Bacilli. Referred to the author for relief of prostatic obstruction, rectal examination showed a very large adenomatous prostate, general condition poor, preliminary cystostomy advised but refused, against dictates of

judgment retropubic removal of a large trilobed gland carried out immediate post-operative course uneventful catheter removed on seventh post-operative day and easy micturition followed eleventh day pyrexia and rigors and a left-sided pyelonephritis ensued from which the patient succumbed

WOUND SEPSIS

This has in our experience been singularly rare despite the bad name the retropubic space has had in the past A consecutive series of 5 cases in one hospital developed wound infection and this was tracked down to the use of some unsterilised Sulphanilamide powder which had been routinely dusted into the operative field When this had been autoclaved no further similar trouble was met with (Too many people believe that the sulphonamides are self-sterilising)

SUPRAPUBIC URINARY LEAKAGE

A small number of cases will leak urine suprapubically after the removal of the catheter In our experience this has been most commonly met with in the case of the thin walled chronically overdistended bladder and we now advise a minimum of 2 weeks pre-operative drainage either by suprapubic tube or indwelling catheter to allow the bladder to regain its tone Adequate pre-operative control of urinary infection and accurate capsular suturing are the best safeguards against a post-operative urinary leak Even when it occurs it is seldom of moment and a further period of urethral catheter drainage will effect a watertight closure

The following case illustrates some of these points —

H G 67 prostatic symptoms for several years one attack of retention lasting 10 days rectal examination revealed large benign prostate about to undergo arthrodesis for painful osteoarthritic hip prostatectomy advised lest recurrence of post-operative urinary retention no marked residual urine Blood Urea 45 mgms per cent

2.8.46 Retropubic prostatectomy, moderate sized bi lobed gland

6.8.46 Catheter removed 20 oz urine passed during day with some suprapubic leakage

- 7 8 46 Urinary leakage still present , catheter replaced
12 8 46 Catheter removed , voided without leakage
16 8 46 Discharged soundly healed

PERSISTENT FISTULA

No case of this has been met with nor do I see why it ever should occur with this operation In one very instructive case reported by my colleague Mr Ogier Ward, the patient developed heart block during the operation and was deemed to be in extremis , no time was available for capsular closure and he was returned to the ward for supportive therapy, with a drain in the retropubic space Prolonged suprapubic urinary leakage occurred but the patient left hospital in 9 weeks soundly healed This case, an extreme one, demonstrates that even failure to attempt capsular closure with subsequent urinary leakage will not lead to a persistent fistula

INCONTINENCE

We have met with one case of persistent urinary incontinence Great care should be taken, as always, not to avulse any of the mucosa of the membranous urethra Should this occur some degree of incontinence will follow for some weeks irrespective of the route by which the gland has been removed (see Figs 93, 94) If the technique outlined earlier is scrupulously followed no such risk should occur It should be noted in this connection that, mechanically, the enucleation of the adenoma by the retropubic route is sounder than in the transvesical in that the enucleating finger is working at right angles to the urethra and not in the long axis The risk of avulsing any of the membranous urethra should be minimal and the sectioning of the anterior wall of the canal adjacent to the apices of the lateral lobes should safeguard the position still more

The early removal of the catheter is followed in some cases by an urgency of urination amounting to a virtual incontinence for a few days but this is transient Only three cases have left hospital with any incontinence and two cleared up within a few weeks

incised carefully and each muscle turned outwards (Fig 95) so exposing the Bulb. With scissor dissection this structure is freed on its deep aspect from the superficial layer of the Urogenital Diaphragm (Triangular Ligament) until it is possible to pass the index finger around the bulb close to the membranous urethra. The bulb is next lapped twelve times with $\frac{3}{8}$ inch. chromicised ribbon catgut and the ends tied

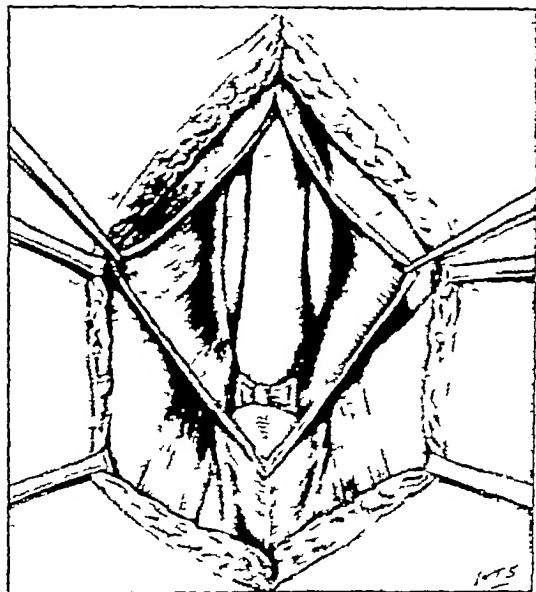


FIG 95

Ribbon catgut encircling loops tied about corpus spongiosum

securely, drawing it tight over the spongy tissue with its contained catheter (Fig 95). The Bulbo-cavernosi muscles are re-approximated in the midline with a continuous suture of No. 0 catgut. Colles' fascia is similarly approximated and the skin incision closed without drainage with silk-worm gut. The indwelling catheter is maintained for 5 days. On removing the catheter continence is usually complete though in some instances a retention may supervene and necessitate the further use of the catheter.

The following case is illustrative —

E.H., æt. 66, underwent Harris Prostatectomy 1936; stenosis of prostatic bed followed rapidly, Punch resection of scar tissue four months later, almost complete urinary incontinence followed, and persisted $2\frac{1}{2}$ years.

ŒDEMA OF THE PENIS

This was mentioned as a frequent sequel of the operation by Newell¹. We have experienced it in a marked degree exceedingly rarely and it would appear to be due to unduly extensive coagulation or ligation of the tributaries of the deep dorsal vein of the penis close to the subpubic arch. With our present technique these veins are sectioned at a high level after they have already drained extensively into the periprostatic venous system. Its occurrence is of little moment owing to the full anastomosis between the deep and superficial venous systems of the penis. The superficial system rapidly takes on the extra work. This we saw most clearly whilst employing the subpubic approach in which the deep dorsal vein was deliberately sectioned whilst preserving the superficial veins. A temporary œdema of the organ was the rule but in no instance proved permanent.

ECCHYMOSIS OF THE PENIS

In a small number of cases the oozing of blood into the retropubic space leads to a subpubic seepage into the loose subcutaneous spaces of the penis with consequent discoloration. This disappears within a few days.

ILEUS

We have as yet met with no case of this troublesome and sometimes dread complication, in contra-distinction to our experience whilst employing the transvesical route. The reason is not certain but is probably due to the lack of interference with the peritoneum.

LATE SEPARATION OF SLOUGHS

Two cases have been met with where a moderately large slough has been passed during the third week after leaving hospital. In one it lodged at the external urinary meatus and was extracted by the patient with his wife's eyebrow tweezers! In each case rather more diathermic coagulation than usual was employed. We regard it as important to use the diathermy

¹ NEWELL, R. L. (1946). *Lancet* i. 161

ligature It would appear preferable to me to have such sepsis subcutaneous in the scrotum rather than deep in the pelvis where diagnosis is difficult and sequelæ possibly serious

POST-PROSTATECTOMY OBSTRUCTION

This occurred five times in the first 75 cases, always at the vesical outlet In the last 200 cases we have routinely either excised a wedge from the posterior lip of the bladder neck (Figs 68, 69) or fixed this structure to the floor of the prostatic bed with a suture after the manner of the posterior stitch in the Harris technique (Figs 70, 71) We have had no such occurrence since adopting this manoeuvre Four of the above mentioned cases required a transurethral resection of the fibrosis at the vesical outlet Each of these was a minor procedure and the patient was able to leave hospital three or four days later They have been carefully followed up and no further trouble has been experienced (See Chapter 20)

OBTURATOR NEURITIS

3 cases of this have been met with In one, the symptoms were minimal and cleared up quickly In a second case the symptoms persisted for almost 3 months but eventually cleared up completely The third case is still under observation The exact cause is obscure It is presumably due to pressure on the nerve in its intrapelvic course during the operation Whether it is caused by the use of unduly long lateral blades on the retractor or to excessively tight packing on either side of the prostate or the local use of Sulphonamide powder we are not certain

OSTEITIS PUBIS

I have not experienced this complication after the retro-pubic operation though I did have such a case after a two-stage Freyer enucleation some years ago Riches¹ reported two cases of this complication but I opine that these resulted from a pricking of the periosteum of the pubis with the Boomerang needle. Such must be scrupulously avoided

¹ Riches, J. W. (1946) "Repts Congress Brit Assn Urol Surg"

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¹ NEWELL, R. L. (1916). *Lancet* 1: 181.

needle as little as possible and to localise the coagulating effect to a minimal area. Post-operative cysto-urethroscopy in a large number of cases has shown that there is little evidence of sloughs after the tenth day. We regard it as safe to allow patients to leave hospital as early as the twelfth post-operative day and indeed quite a number wish to depart even earlier.

PULMONARY COMPLICATIONS

Apart from a single case of pulmonary embolus (already mentioned) and one post-operative pneumonia, lung complications have been conspicuous by their absence. This I attribute to the excellence of the anæsthesia rather than to any inherent virtue of the operation. The insistence of early and thorough breathing exercises and the minimal necessity for opiates after the retropubic operations are probably contributory factors to the virtual disappearance of those erstwhile scourges—pneumonia, pulmonary collapse, and embolus.

OLIGURIA

As few cases are now operated upon until renal equilibrium has been established either by indwelling catheter or by suprapubic drainage, this complication is seldom met with. A copious fluid intake either orally or by intravenous drip is insisted upon. In 4 cases in which the Wilson Hey technique was followed, namely of operating forthwith without drainage on chronic retentions, a grave suppression followed in every instance and necessitated the use of intravenous Sodium Sulphate solution 4.285 per cent (isotonic) to re-establish flow. One of these cases succumbed from progressive renal failure, on the 4th post-operative day.

ACUTE DILATATION OF THE STOMACH

This occurred in one case in a mild degree but rapidly responded to the use of gastric suction via a Ryle's tube. The main danger of this formerly dreaded complication lies in its failure to be diagnosed. Any vomiting more than 24 hours after operation should put the attendant staff on its guard.

Nor indeed is vomiting always a symptom of acute dilatation of the stomach in its earlier stages. A persistent hiccough or a rising pulse rate without fever or other obvious cause will call for the use of a Ryle's tube and an unexpectedly large gastric retention may be found.

RETENTION DUE TO DETRUSOR ATONICITY

Where adequate pre-operative drainage to allow the chronically over-distended bladder to recover its tone has not been given removal of the catheter after a retropubic prostatectomy may be followed by complete inability to void. A further period of catheter drainage will be necessary accompanied by para-sympathetic stimulants and Silver Nitrate irrigations.

Illustrative Case —

E.B. æt. 68 history of prostatism for 4 years F D/N hourly/3, acute retention for 4 days treated with indwelling catheter. Blood Urea 46 mgms per cent.

19.7.46 Retropubic Prostatectomy, large trilobed gland

23.7.46 Catheter removed voided without leakage

25.7.46 Catheter replaced as residuum had mounted to 30 oz

27.7.46 Catheter removed

Daily catheterisation residuum decreasing slowly from 600 c.cs.

4.8.46 Discharged symptom free but still carrying residuum of 300 c.cs.

3.10.46 Symptom free residuum 30 c.cs.

RETENTION DUE TO SPASM

An occasional case has been met with where following removal of the catheter on the third or fourth post operative day the patient has been unable to void. It has occurred almost invariably in the extremely nervous patient where the fear of or actual manifestation of pain on attempting miction leads to a reflex spasm and consequent retention. This will sometimes respond to a hypodermic of Morphine but may need the re introduction of the catheter for a further 48 hours.

CHAPTER XIV

SUB-CERVICAL AND SUB-TRIGONAL LOBES

THE grosser examples of sub-cervical lobe hypertrophy frequently associated with lateral lobe enlargement are dealt with as described in Chap 9 but examples of small isolated lobules, either sub-cervical or sub-trigonal, impinging on the vesical neck are occasionally met with causing bladder neck obstruction. These are, in general, adequately dealt with by transurethral resection but can be very satisfactorily removed by the retropubic approach as instanced by the following two cases

B.J J T, æt 60, complained of urinary difficulty for some months becoming progressively worse; increased urinary frequency by day and night, nocturia 3-4 and incontinence, residuum 100 ccs, urine uninfected. Circumstances demanded attention in an outlying Nursing Home in which no diathermy unit was available. Cysto-urethroscopic examination revealed the presence of an isolated sub-trigonal lobule with no intra-urethral lateral lobe enlargement and no elongation of the supramontine urethra. Retropubic excision was decided upon. A No. 18 F rubber Tiemann catheter was passed, emptying the bladder and left in situ. The small prostate was exposed retropubically in the routine manner and packing gently inserted on each side of the gland. The anterior commissure was then incised longitudinally to expose the catheter lying in the prostatic urethra. The cut edges of this incision were seized with long Allis forceps and the catheter withdrawn until its tip lay in the membranous urethra. The floor of the prostatic urethra was thus exposed. The "spreader" was then introduced through the bladder neck in a retrograde manner, opened, and the anterior lip drawn upwards by the assistant, so revealing the trigone and the

upon A technique similar to that described above was adopted, save that no undermining of the trigone was necessary The bladder neck was incised on each side of the sub-cervical lobule and the latter enucleated with closed curved scissors The procedure took but 18 minutes and the patient

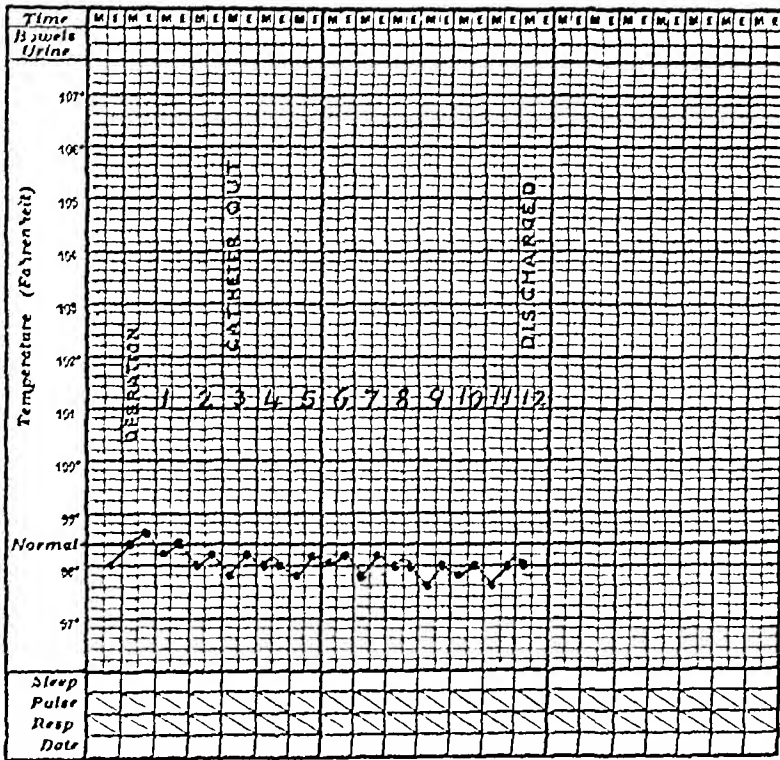


FIG 97
Temperature Chart

left hospital on the twelfth post-operative day with clear urine and symptom free apart from some urgency, which rapidly disappeared

It is exceedingly doubtful if an easier post-operative course would have been obtained in either of these cases if a trans-urethral resection had been performed and there is the added satisfaction that in each instance the tumour was removed complete

CHAPTER XV

THE FIBROUS PROSTATE

PROSTATIC fibrosis synonymously termed "maladie du col," "prostatisme sans prostate" by the French dyssectasia, median bar, sclerosis of the bladder neck, etc. is responsible for many of the gravest cases of prostatic obstruction. The condition is prone to occur in a younger age group than the adenomatous obstruction. Its onset is singularly insidious and the symptoms seldom distressing to the patient until serious obstruction has occurred with gross bladder distention and marked renal impairment. Frequency of micturition is noted over many years but seldom of extreme degree unless infection supervenes.

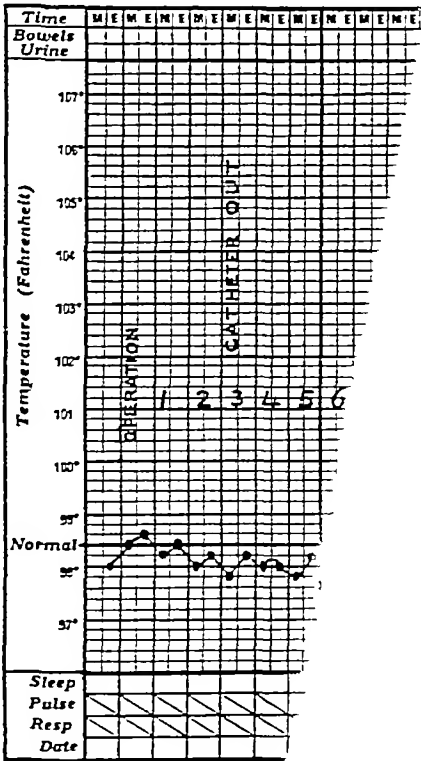
Most cases present a three-fold problem: 1. restoration of impaired renal function; 2. removal of the obstruction; 3. restoration of vesical function. Unless the renal dysfunction is so severe as to be irreparable it can usually be sufficiently improved by indwelling urethral catheter or suprapubic drainage of adequate duration to render surgical attack on the obstructive cause a feasible proposition. This attack may be made in a variety of ways the three most commonly employed being the following:—

1. A transvesical excision of a wedge from the posterior aspect of the bladder neck with or without the use of the endothermy knife. Harris¹ advocated a special suturing of the excised area to hasten epithelialisation but few found this necessary and it was not widely adopted.

2. Marion and his disciples use a more formidable procedure. After wide exposure of the bladder base by a suprapubic transvesical incision and application of a self retaining retractor the anterior and posterior lips of the bladder neck

¹ HARRIS, S. H. (1933). *Brit. J. Urol.* 7, 279.

upon A technique similar to adopted, save that no underm necessary The bladder neck was sub-cervical lobule and the latter e scissors The procedure took bu



left hospital on the two and symptom free after disappeared.

It is exceedingly would have been of urethral resection with satisfaction that complete

Moryl Doryl or Carbachol are undoubtedly helpful, Strichnine has its uses and daily catheterisation with appropriate use of Silver Nitrate instillations to combat post-operative infection may be necessary always in combination with prolonged use of Sulpha therapy or other urinary antiseptics, until adequate detrusor function is regained.

The retropubic approach may be usefully employed in a number of these fibrous glands especially in the presence of urethral stricture or the congenitally small calibred canals. I have utilised it seven times. The technique differs somewhat from that employed in the enucleation of the adenomatous gland and previously described.

After the preliminary cysto-urethroscopy the bladder is emptied and a No 15 or 18F rubber Tiemann catheter passed. This is left in situ. The anterior surface of the gland is exposed retropubically and the lateral spaces packed off as in the routine operation. The prostatic capsule is incised longitudinally in the midline from just below the bladder neck downwards for $1\frac{1}{2}$ cms. to expose the catheter. The edges of the incision are seized with long Allis forceps and the catheter withdrawn until its tip lies in the membranous urethra. The floor of the prostatic portion of the canal is thus visualised and the distal aspect of the vesical outlet inspected and palpated. The spreader is now introduced into the bladder neck by the assistant opened and the anterior lip drawn upwards so exposing fully the posterior lip. The latter structure is now seized with appropriate toothed forceps (my personal predilection being for those depicted in Fig 55) and a resection of the full thickness of the neck made with curved scissors. Obvious bleeding points may be touched with the diathermy needle but this manoeuvre is seldom necessary. Attention is next directed to the region of the lateral lobes of the prostate from each of which a small fibrous nodule may usually be dissected with scissors. The catheter is now advanced along the urethra and introduced into the bladder. The longitudinal incision in the capsule is closed with a running suture of No 1 catgut, and the operation concluded in the routine manner.

are seized with Kocher or other appropriate forceps, taking care to secure a good bite of the whole thickness of the neck and not merely the mucosa. With a bistoury a circular incision is made $1\frac{1}{2}$ -2 cms from and around the neck. Whilst exerting traction on the forceps applied anteriorly and posteriorly on the neck, the circular incision is deepened with knife or scissors for approximately 2 cms working more deeply on the posterior aspect. The dissection proceeds approximately as far as the ejaculatory ducts. The urethra is cut across with scissors in the depths, and the mass including the greater part of the fibrous gland and the sclerotic neck is lifted out. The cavity is then packed and the bladder drained suprapubically in the routine manner.

3 Transurethral resection of the sclerotic bladder neck and encroaching intra-urethral fibrous nodules. This procedure has in most clinics supplanted the two previously mentioned operations. I personally have regarded this as the method of choice during the past 15 years, but would stress two points which I regard as of particular importance: (a) that a relatively small resectoscope should be employed, (b) that a thorough post-operative care of these cases is essential as the usual thin-walled atonic bladders require a considerable time to resume their full function. With regard to the former point, I am certain that a high proportion of urethræ are incapable of accommodating the standard sized No 30F resectoscopes without trauma, and indeed this large sized instrument is quite unnecessary for these sclerotic glands. I employ a No 25F resectoscope for these cases, and so minimise the possibility of post-operative stricture all too frequently seen after the use of larger instruments. The second point, that of adequate post-operative care of the atonic bladder, is too commonly neglected. All operations on the urinary tract are followed by a period of urinary infection of varying degree, whether the procedure be by cold punch, endothermy loop, or open operation, and if this be superimposed on an atonic incompletely emptying bladder the stage is set for ascending infection, which may well prove disastrous, or for intractable vesical sepsis. Parasympathetic stimulants such as

Morly Doryl or Carbachol are undoubtedly helpful. Strychnine has its uses and duly catheterisation with appropriate use of Silver Nitrate instillations to combat post-operative infection may be necessary always in combination with prolonged use of Sulpha therapy or other urinary antiseptics until adequate detrusor function is regained.

The **retropubic approach** may be usefully employed in a number of these fibrous glands especially in the presence of urethral stricture or the congenitally small calibred canals. I have utilised it seven times. The technique differs somewhat from that employed in the enucleation of the adenomatous gland and previously described.

After the preliminary cysto-urethroscopy the bladder is emptied and a No. 15 or 18F rubber Tiemann catheter passed. This is left in situ. The anterior surface of the gland is exposed retropubically and the lateral spaces packed off as in the routine operation. The prostatic capsule is incised longitudinally in the midline from just below the bladder neck downwards for $1\frac{1}{2}$ cms. to expose the catheter. The edges of the incision are seized with long Allis forceps and the catheter withdrawn until its tip lies in the membranous urethra. The floor of the prostatic portion of the canal is thus visualised and the distal aspect of the vesical outlet inspected and palpated. The spreader is now introduced into the bladder neck by the assistant, opened and the anterior lip drawn upwards so exposing fully the posterior lip. The latter structure is now seized with appropriate toothed forceps (my personal predilection being for those depicted in Fig. 55) and a resection of the full thickness of the neck made with curved scissors. Obvious bleeding points may be touched with the diathermy needle but this manoeuvre is seldom necessary. Attention is next directed to the region of the lateral lobes of the prostate from each of which a small fibrous nodule may usually be dissected with scissors. The catheter is now advanced along the urethra and introduced into the bladder. The longitudinal incision in the capsule is closed with a running stitch of No. 1 catgut and the operation concluded in the routine manner.

- 59 45 Cystoscopic examination revealed mouth of diverticulum finely trabeculated bladder sclerosis of bladder neck with small intraurethral nodules It was decided to leave the diverticulum untouched Retropubic excision of posterior lip of bladder neck with excision of intraurethral nodules



FIG 89
Cystogram

- 129 45 Catheter removed unable to void. Catheter replaced para sympathetic stimulants administered.
22 9 45 Voiding re-established
2.10 45 Discharged

[Note —These chronically overdistended bladders require a prolonged period of drainage to allow the detrusor muscle to regain its tone]

March, 1946. Reported increasing difficulty in urinating. Cysto-urethroscopy showed no demonstrable obstruction: Cystiography revealed large vesical diverticulum shown in Fig. 99. Diverticulectomy carried out with complete relief of symptoms.

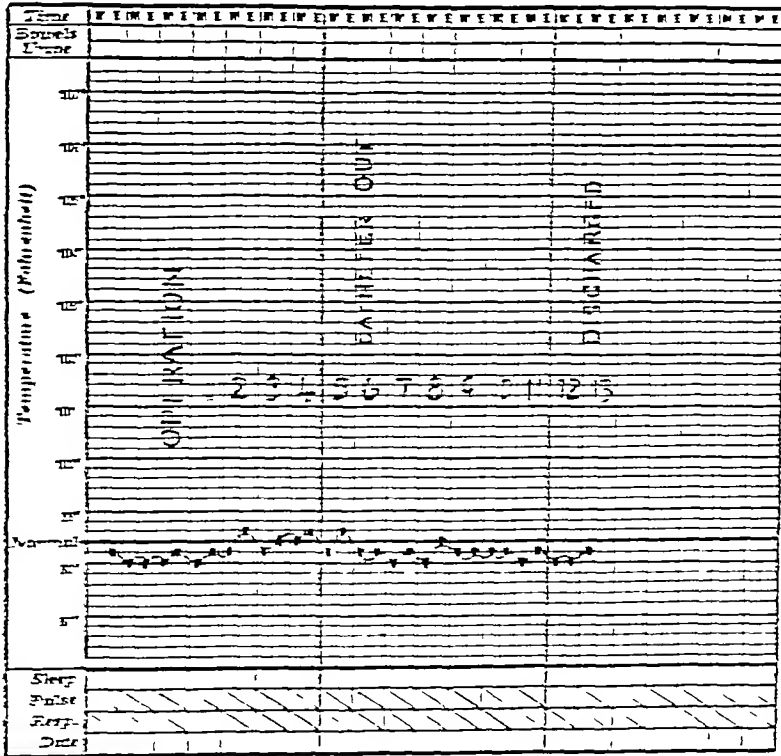


FIG. 100
Temperature Chart

RETROPUBIC TRANSVESICAL OPERATION

An alternative method, easier but not so complete adopted in two cases with wholly satisfactory result is the following. The routine retropubic exposure is made following cysto-urethroscopy which has established the presence of a median bar, the bladder being empty and no catheter in place. The position of the bladder neck is carefully identified and the bladder opened transversely 1 cm. above the neck. A traction suture is placed through each lip of the incision in the midline. Drawing on these, the bladder base and vesical aspect of the

outlet are well visualised. Grasping the full thickness of the posterior lip of the neck with toothed forceps the customary wedge excision is made bleeding points are attended to with the diathermy needle if necessary. A urethral catheter is now passed and carefully placed the eyes being well within the bladder. The transverse incision in the bladder is closed in two layers with continuous sutures and the wound closed with a small corrugated drain into the retropubic space. This method will suffice in cases of median bar where no intra urethral encroachment is noted endoscopically.

Illustrative case —

P.M. æt. 69 slowing urinary stream and increasing difficulty for years nocturia 2 little increased frequency by day. No enlargement of prostate per rectum.

14.9.45 Cysto-urethroscopy showed merely sclerotic median bar. Above transvesical retropubic technique employed. uneventful convalescence.

20.9.45 Catheter removed micturition followed.

27.9.45 Discharged symptom free.

Nine months later reported complete freedom from urinary symptoms.

CHAPTER XVI

THE CALCULOUS PROSTATE

UNDER the heading of **Calculus Prostate** one has to consider three distinct entities —

a “Adenomatous” enlargement of the prostate with concretions in the periphery, i e, between the “adenoma” and the pathological capsule

b Calculous Prostatitis, in which the concretions are distributed throughout the substance of an atrophic and chronically infected gland

c True urinary calculus or calculi lodged in the lumen of the prostatic portion of the urethra, having origin higher in the urinary tract

In the first of these types, treatment offers no particular problem. Where operative intervention is indicated, the “adenomatous” mass can be enucleated by any of the accepted routes either as a one- or two-stage procedure, such concretions as are met with being removed at the enucleation. Being situated in the zone of cleavage they are readily accessible. Any of the concretions inadvertently left behind will be washed out or voided subsequently. Occasionally such a concretion may escape into the bladder, and remain there to act as a nidus for the development of a vesical calculus. Such cases can also be tackled transurethrally, but few operators will secure a complete enough resection to lay bare the capsule in its entirety and secure the complete evacuation of the peripherally placed calculi.

True calculous prostatitis is frequently present for many years before causing symptomatology warranting operative treatment. The exact rôle an antecedent infection, e g, gonococcal prostatitis, plays in its etiology is not established, but suffice it to say that most cases calling for surgical treatment are infected, and many have impaired renal function. It is

this combination which renders the surgical treatment difficult. Surgeons who deal with these cases by the classical transvesical route often find themselves in a quandary as to whether to employ a one- or a two-stage procedure. In my experience preliminary drainage is almost invariably required though such was not the counsel of the late Swift Joly.¹ The indwelling urethral catheter is poorly tolerated by these cases and a suprapubic tube is usually necessary. The transvesical extirpation of the gland is not easy as a secondary procedure. Visual exposure of the bladder base is difficult unless a sufficiently long period has elapsed since the cystostomy to allow the fibrosis in the abdominal wall to subside. (Many allow a minimum of 6 weeks.) Mobilisation of the bladder is essential. The procedure most commonly adopted is then incision into the gland with removal of the concretions and as much of the infected glandular tissue as is possible with a sharp curette. At best many concretions are left behind and indeed no little of the infected prostatic tissue. The functional results leave much to be desired (Riches and Muir 1933). Other operators employ the perineal exposure and deal with the concretions and infected glandular tissue similarly by means of the curette. Here again the results are on the whole unsatisfactory (Henline).²

In recent years many urologists have been content to deal with these cases by transurethral resection. It is certainly possible to remove much of the infected prostatic tissue and many of the concretions by this approach and to secure results no worse than those obtained by the classical open operations. This endoscopic procedure is still probably that of choice in young subjects where a retention of sexual potency is required but it inevitably remains an incomplete procedure and may leave behind infected glandular tissue and a varying number of concretions. The urinary infection persists.

Henline after an extensive study of these cases and the results of the above mentioned procedures advocated a sub-

¹ Joly J. Swift (1929) *Floer and Colicous Disease*

² Riches E. W. Muir G. C. (1933) *Brit J Surg* 20 366

³ Henline Brit (1940) *J Urol* 44 156

total perineal prostatectomy in men of age groups where a retention of sexual potency was of little moment. In this operation he removes all the prostate within its capsule except a small button at its apex. I am in agreement with his advocacy in some cases of a radical removal, but now employ the retropubic approach in preference to his perineal



FIG 101
Sub-total radical prostatectomy Sectioning apex of prostate

exposure which I formerly utilised. I find it easier, there is less danger of injuring the rectum and compressor urethræ, and the hæmostasis of the bladder neck and suturing to the apex of the prostate are comparatively simple. Moreover, a temporary suprapubic tube is readily inserted without additional incision, if required or if it has not already been introduced as a preliminary measure.

THE OPERATION OF SUB-TOTAL RETROPUBIC PROSTATECTOMY

The endoscopic examination will probably have been made as a part of the preliminary investigation. The bladder is emptied by means of a No 15F Tiemann rubber catheter, and

the latter left in situ. The anterior aspect of the prostate is exposed as already described in the operation for adenomatous enlargement. The lateral surfaces of the gland are separated from the levatores ani by gentle dissection with the index finger and swabs on holders. The right index finger is then



FIG 102

Sub-total radical prostatectomy. Line
of incision at bladder neck.

gently employed to free the apex of the gland from the underlying rectum always taking care to keep ventral to Denon villier's fascia. When the gland has been thus completely freed on its under surface the rectum is protected with a flexible copper spatula and a transverse sectioning of the prostate and its contained urethra (identified by means of the contained catheter) is effected with the scalpel (long handled variety is best) leaving about 1 cm. of prostatic tissue distally. 2 or 3 Kocher's forceps are applied to the bleeding points in the distal prostatic tissue taking care not to pinch the urethral mucosa (Fig 101). The catheter is now withdrawn so that its tip lies in the membranous urethra. The proximal portion of the prostate is now seized close to the line of section by

total perineal prostatectomy in men of age groups where a retention of sexual potency was of little moment. In this operation he removes all the prostate within its capsule except a small button at its apex. I am in agreement with his advocacy in some cases of a radical removal, but now employ the retropubic approach in preference to his perineal

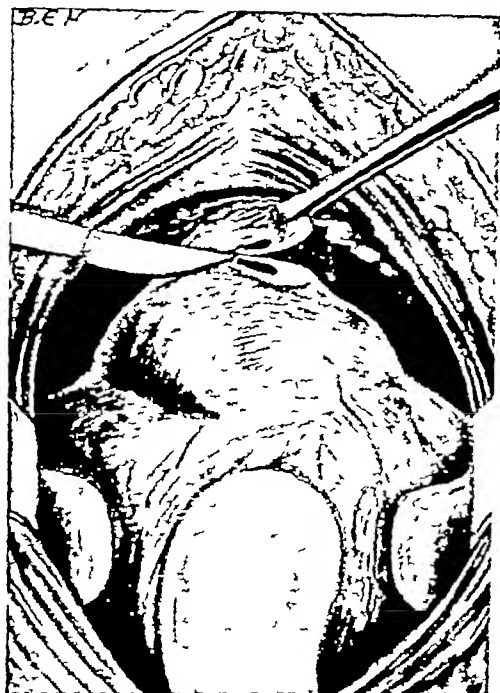


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carried out as a preliminary intervention. In the 2 cases in which the procedure has been utilised we have removed the catheter 48 hours later and maintained the suprapubic tube for 14 days. It is possible that suprapubic drainage might in some cases be dispensed with and reliance placed on the indwelling catheter for 10 days or so. A corrugated rubber drain is placed down to the suture line and the wound sutured routinely.

By this operation as in Henline's the greater part of the prostate is removed within its capsule thus eradicating all the infected glandular tissue and the contained concretions.

ALTERNATIVE OPERATION

In the majority of cases the above radical procedure may be held to be unduly drastic and a more conservative retropubic operation analogous to that commonly practised via the perineal route be adopted. This entails as mentioned earlier, exposure of the prostate incision of the capsule followed by curettage of the calculi and as much of the infected glandular tissue as possible.

Conservative Retropubic Operation for Calculous Prostate 1—The anterior surface of the prostate is exposed in the routine retropubic manner after the introduction of a No. 15F Tiemann catheter. A midline longitudinal incision through the capsule and anterior wall of the urethra is made exposing the catheter. The edges of this incision are now grasped with long Allis forceps and the catheter withdrawn until the tip is lying in the membranous urethra. Using a small sharp curette as much as possible of the infected prostatic tissue is removed with its contained concretions. The capsule should be laid bare and no concretions should be palpable to the exploring finger. When this has been satisfactorily accomplished, a small pack is placed in the cavity whilst attention is directed to the bladder neck which will be found to be sclerotic in most cases. The spreader is inserted into the vesical outlet and held open by the assistant drawing the anterior lip upwards. This enables the operator to visualise

means of 2 Kocher's or other appropriate forceps, and drawn forwards whilst it is cleared posteriorly from the shining fascia of Denonvillier up to the bladder neck. Adhesions to the vesicles are now encountered and divided. Bleeding points are

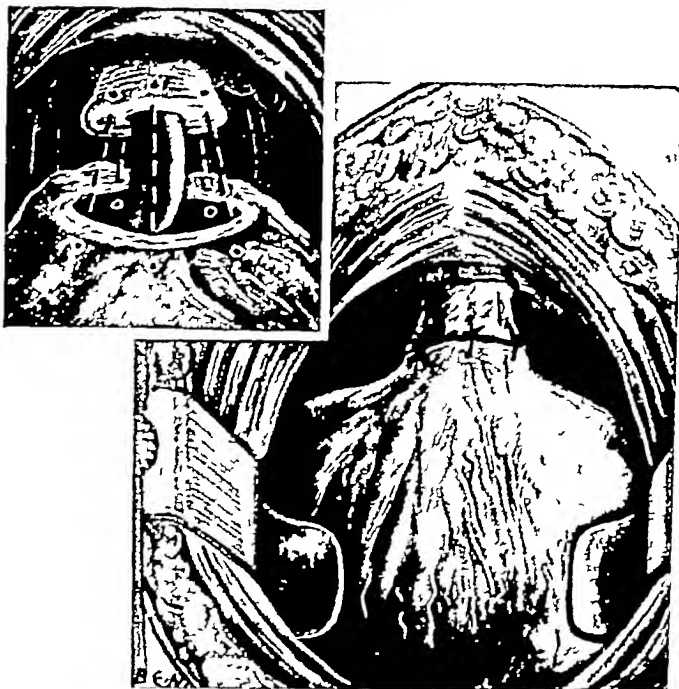


FIG 103

Sub-total radical prostatectomy Approximation of bladder neck to apex of prostate

grasped with hæmostats and coagulated. The gland, complete in its true capsule, is now attached merely to the bladder neck (Fig 102). It is sectioned immediately adjacent to this structure. Bleeding vessels, notably the 2 prostatic arteries, are visualised, seized with hæmostats, and coagulated. The trigone is now mobilised until the bladder can be drawn down to the apex of the prostate without tension. The catheter is advanced until the eye lies within the bladder. The bladder neck is now sutured to the prostatic apex by means of 5 sutures of No 1 chromicised catgut, the knots lying, as usual, externally. I have found a small boomerang needle best for this purpose (Fig 103). In many cases where infection has been marked it will be best to insert a suprapubic de Pezzer tube into the bladder through its anterior wall, if this has not been

carried out as a preliminary intervention. In the 2 cases in which the procedure has been utilised we have removed the catheter 48 hours later and maintained the suprapubic tube for 14 days. It is possible that suprapubic drainage might in some cases be dispensed with and reliance placed on the indwelling catheter for 10 days or so. A corrugated rubber drain is placed down to the suture line, and the wound sutured routinely.

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the posterior lip. It is seized with the angled grasping forceps (Fig 55) and a generous wedge resected with curved scissors. The pack is now removed and after any obvious bleeding points have been dealt with by means of the endothermy needle the catheter is advanced until the eye is within the bladder. The incision in the capsule is now closed with a continuous

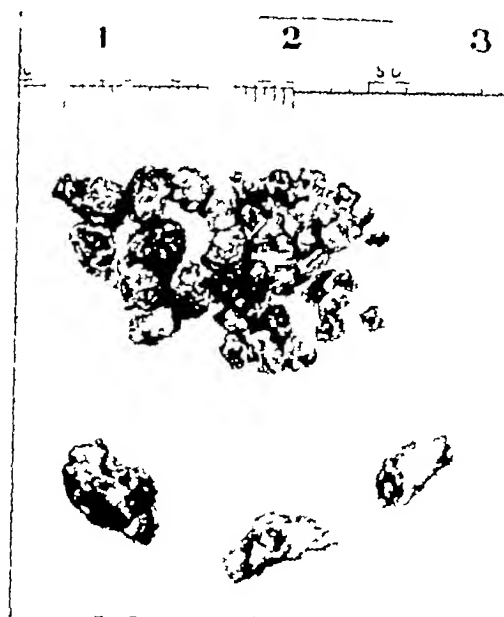


FIG 104

Shows calculi and fibrous prostatic tissue removed from case mentioned below

suture, the retropubic space dusted with sulphanilamide powder and the abdominal wall closed with the routine drain. Where a preliminary cystostomy has been made this is dealt with as described on page 111.

Illustrative cases —

J S L, æt 64, urinary symptoms for $5\frac{1}{2}$ years since exposure in open boat after being torpedoed in 1940, frequency, pain and difficulty of micturition, urine grossly infected, small firm prostate on rectal examination, bladder almost to umbilicus, skiagrams showed calculosis of prostate, Blood Urea 67 mgms per cent

19 1 46 Suprapubic Cystostomy; discharged for recovery of general and renal condition

- 24 5 46 Retropubic Evacuation of Prostatic Calculi; wedge excision of bladder neck and nodules from each lateral lobe (Fig 104)



FIG 105

Pre-operative skigram of above case showing extensive calculous disease of prostate



FIG 106

Post-operative skigram note complete disappearance of calculi

- 1 6 46 Catheter removed voided normally with very slight leakage
13 6 46 Discharged home soundly healed

9 8.46. General condition "better than for years", retaining urine for 4-5 hours by day and one or two disturbances at night. Excellent stream Urine still hazy

11 11 46 Urine clear. F = normal/0-1

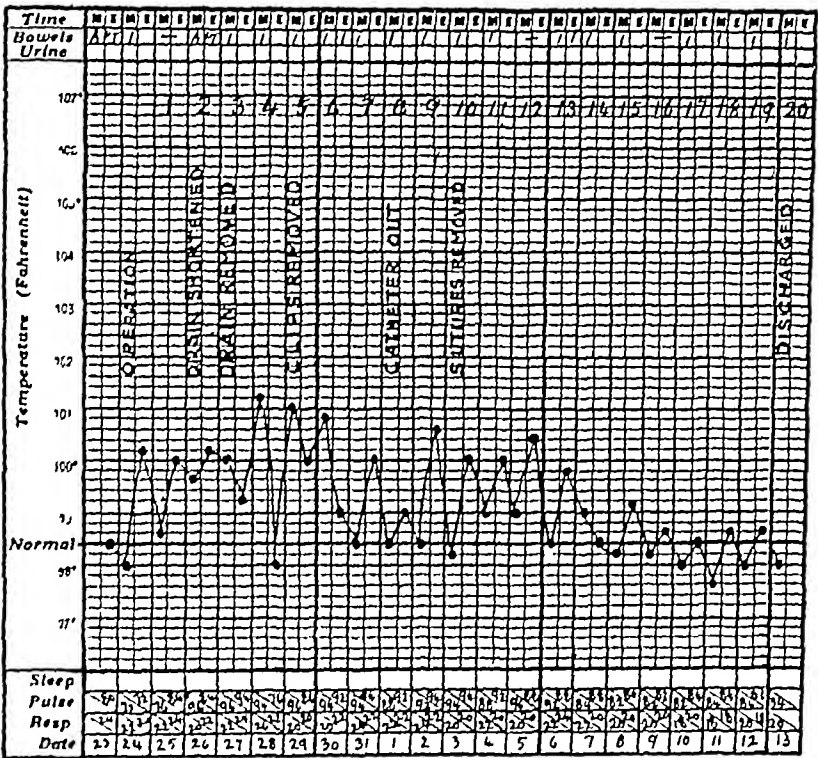


FIG 107

Temperature chart of above case — second stage
evacuation of prostatic calculi

H E.W , æt, 36 , for 2 years noticed difficulty of urination , stream poor , no marked frequency ; terminal dribbling , rectal examination revealed crepitus suggestive of calculous prostate , confirmed by X-Rays (Fig 103) Blood Urea 36 mgms per cent

9 7 46 Retropubic evacuation of calculous prostate (Fig 106)

16 7 46 Catheter removed , voiding well with slight incontinence at night

31 7 46 Discharged with free urinary stream and no marked frequency incontinence had cleared up



FIG 108

Pre-operative skigram extensive calculous disease of prostate

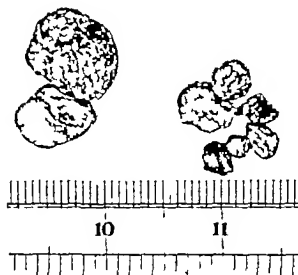


FIG 109

Calculi removed from above case

20 8 46 Symptom free stream excellent frequency D/N normal/0-1



FIG. 110
Post-operative skiagram, complete disappearance of
calculi



FIG. 111
Post-operative Urethrogram

STONES IMPACTED IN THE PROSTATIC URETHRA

The vast majority of cases where a vesical calculus becomes impacted in the prostatic urethra can be satisfactorily dealt with by transurethral methods. Where a sound fails to dislodge the calculus the open end of the panendoscope sheath will usually succeed and then litholapaxy by means of a Canny Ryall cystoscopic lithotrite is an easy matter. From time to time, however, cases will be encountered where such stones cannot be dislodged or where retention phenomena are being caused by prostatic calculi impinging on the canal the greater part of the calculus being firmly embedded in the

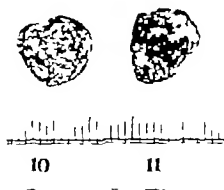


FIG. 112

Two obstructing calculi removed retropubically

prostatic tissue. In such cases endoscopic methods may be contra indicated or impossible. Here open operation is required and the retropubic approach affords an easy way of relieving the obstruction. The prostatic urethra is incised longitudinally as in the preceding operation, the calculi extracted and the capsule sutured. The following case illustrates the use of this procedure —

K.W. æt 76 prostatic symptoms frequency and difficulty for some years due to known prostatic calculi retention supervened general condition precluded any radical procedure retropubic exposure-extraction of the two obstructing calculi capsule sutured catheter drainage 5 days on removal of the catheter free urination (Fig. 112 shows the two calculi)

CHAPTER XVII

CARCINOMA OF THE PROSTATE

FEW cases of carcinoma of the prostate reach the urologist sufficiently early to render cure likely from a radical removal of the tumour, as is obtainable in malignancy elsewhere. In the thirteen years 1928-1941 I met with two cases only in which a presumptive diagnosis of prostatic carcinoma suggested to me the possibility of cure with radical surgery. In one a perineal extirpation was effected with a 22 months' survival, in the other biopsy of a suspicious nodule revealed no evidence of malignancy but merely fibroadenomatous change. The latter case was subjected to a successful suprapubic enucleation. The four years 1941-1945 found us hopeful of the effects of oestrogen therapy, either a sub-capsular orchidectomy or the administration of Stilboestrol and its analogues, and we treated all cases, early and late, with this form of therapy. Though the immediate effects are dramatic in a large proportion of cases, it has now been established that no case of prostatic carcinoma is likely to be cured by oestrogens and attention is again directed to early diagnosis and essays at cure by radical surgery.

Since August 1945, when I first employed the retropubic approach to the prostate I have met with 5 cases in which I felt a radical operation warranted. In one of these the operative exposure revealed an unsuspected widespread involvement which precluded radical surgery. In the other two cases a total prostatectomy including seminal vesicles and half the bladder base was effected and both patients survived the operation regaining urinary continence. It is yet too early to comment on the prospect of cure. In yet a sixth case with bladder base extension a total cysto-prostatectomy following ureteric transplantation into the colon was employed (see later).

The radical operation devised by Young¹ and developed by his disciples and others^{2,4} has not proved easy of execution in the hands of most, and the difficult part of the operation the dissection around the vesicles and bladder base and the subsequent suturing has to be carried out at the maximum depth of the operative field. In the retropubic version of the operation which I have devised this part is nearest to the operator and so best visualised. Though realising fully that but a very small



FIG 113

Author's modified Doyen's rib stripper

proportion of cases of malignant prostate reach the urological surgeon sufficiently early to warrant radical surgery I am convinced that the total extirpation feasible by the retropubic route is that most likely to effect a cure and I place on record the operations I have employed on the above mentioned cases.

When clinical radiological biochemical and, if necessary, perineal biopsy have established the diagnosis and the apparent limitation of the malignant process to the gland proper within its capsule the operation of Retropubic Radical Total Prostatectomy is thus conducted.

TOTAL PROSTATECTOMY

A No 18 F rubber Tiemann catheter is passed along the urethra and is spigotted after the bladder has been emptied. The routine retropubic exposure of the prostate is made. By careful blunt dissection using largely the right index finger the apex of the prostate is freed from the underlying rectum (see Fig 26) the presence of the indwelling catheter helping to define the membranous urethra just distal to the apex of the gland. The author's special curved dissector (Fig 113) modelled on the lines of a Doyen's rib stripper (or a threaded

- 1 YOUNG HERM (1920) "Practise of Urology"
- LOWERY O S, KIRWAN T J (1941) "Clinical Urology"
- 3 REITZ ELMER (1942) "J Urol" 48: 287
- 4 VERNER CH (1944) "Pathologia Urogenitalis" Vol 1

aneurism needle), is then passed under the apex of the gland and using the Harris ligature carrier a length of No 2 braided silk drawn through. The catheter is withdrawn, the apex of the gland seized on each side with a pair of long Allis forceps and the silk knotted securely proximal to the forceps. The urethra is sectioned between the Allis clamps and the silk ligature. The prostate is now drawn upwards and peeled by



FIG 114

Total Prostatectomy Prostate turned upwards revealing vesicles Rectum, covered by fascia of Denonvillier, is seen in depth

gauze dissection from the underlying fascia of Denonvillier, the strong shining layer which separates it from the rectum (Fig 114)

The separation is continued until the attachment of the fascia to the bladder base and vesicles is met. This is now incised transversely in the midline and the freeing of the bladder base proceeded with. Each vesicle is delivered in turn and the vas deferens and vascular pedicle clamped and ligated. When the bladder base has been well undermined the anterior wall of the bladder is opened transversely to expose the trigone (Fig 115). This latter structure is then

sectioned close to the ureteric orifices as shown in Fig 115 and the mass consisting of the greater portion of the prostate the vesicles and half or more of the bladder base removed in a single bloc. It but remains to anastomose the bladder to the urethra distally. The catheter is re introduced along the urethra into the bladder. By drawing on the Allis forceps and using the small boomerang needle catgut sutures 5 in



FIG 115

Total Prostatectomy. Anterior wall of bladder opened transversely. Dotted line shows line of incision of trigone.

number are placed as shown in Fig 116 approximating the new bladder outlet to the membranous urethra the knots being placed externally. The unduly large vesical outlet is next closed vertically by interrupted catgut sutures. A temporary suprapubic de Pezzer drain is placed in the bladder through its anterior wall. The abdominal wall is closed with adequate drainage. The catheter is left in situ for 48 hours to allow for continuous through and through lavage. It is then withdrawn and the de Pezzer tube left in for suprapubic drainage for 14 days. When the suprapubic fistula is almost closed a urethral catheter is inserted to effect the final closure.

Full urinary continence should be obtained always provided that scrupulous care is taken to avoid damaging the compressor urethræ and that cases revealing a downward spread of the malignant process are not subjected to the operation. (It appears to me that even in those cases where

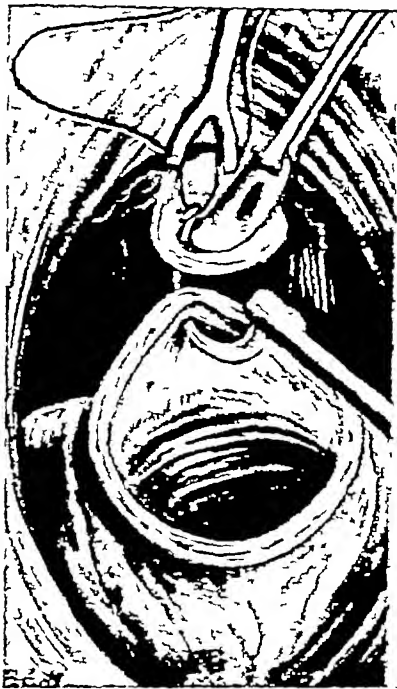


FIG 116
Total Prostatectomy
Approximation of
bladder to membran-
ous urethra. Inset
shows suturing of
unduly large bladder
outlet



the apex of the gland is invaded and where radical extirpation would inevitably jeopardise the compressor urethræ the operation might be justifiably undertaken. The resulting urinary incontinence could later be dealt with by the author's ribbon catgut procedure described elsewhere)¹

In cases where there is widespread involvement of the bladder base and in which an adequate removal would involve the ureteric orifices, an even more extensive procedure may be warranted, namely a preliminary uretero-intestinal transplantation followed by a total cysto-prostatectomy. This I carried out in the following case:—

T.P.A., æt. 57; complaining of increasing dysuria and urinary frequency for upwards of a year. Despite œstrogen

1 MILLIN, TERENCE (1939) *Proc Roy Soc Med* 32, 777

therapy and urinary antiseptics his symptoms increased in severity. The urinary frequency reached the stage of disturbances every twenty minutes day and night always accompanied by strangury and rectal escape. His plight was indeed pitiable. He had lost 70 lbs. in weight. Cystoscopic



FIG 117

Photograph of bladder and prostate. Markers have been inserted into the openings of the ureters. The compact white tissue in each lobe of the prostate is carcinoma.

examination showed ulceration of the vesical mucosa. Bilateral ureteric transplantation was performed with immediate striking general improvement. The amelioration was so marked that some weeks later a total cysto-prostatectomy was performed (Fig 117). No special operative difficulty was encountered and the post-operative course was extremely satisfactory for 5 days. He then developed an acute dilatation of the stomach and despite intravenous therapy, continuous gastric suction and the usual supportive measures he succumbed from cardiac failure. In retrospect it is apparent that the extreme loss of weight indicated a metastatic spread not clinically detectable.

CHAPTER XVIII

CARCINOMA OF BLADDER

A fuller recognition of the poor results in the conservative treatment of extensive papillomatosis and carcinoma of the bladder in the great majority of such cases has led to a wider application of radical surgery to these dread ailments (Fig. 118).

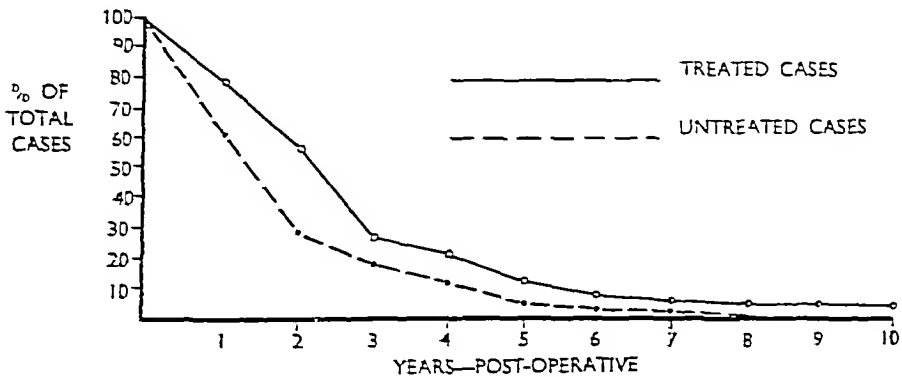


FIG 118

Carcinoma of Bladder Graph showing Survival Time
of two groups of cases (148 treated 28 untreated)
Amer J Cancer (1937)

The procedure most commonly adopted to-day—excluding those early carcinomata localised to the lateral wall of the bladder suitable for segmental resection (Fig. 119), and the obviously inoperable malignant tumours with extravesical extension—is uretero-intestinal anastomosis followed by total cysto-prostatectomy. Improvements in technique and ancillary aids such as blood transfusion, intravenous sodium sulphate, sulpha drug therapy, and the like, have reduced the mortality of these formerly formidable operative adventures to reasonable dimensions. With a judicious selection of cases and skilful surgery, the combined operative mortality should not now exceed 10-15 per cent.—a justifiable mortality when

we consider the nature of the disease and the pain wracked end of the untreated case. Whether we can hope for a high proportion of ultimate cures is doubtful when dealing with vesical carcinomata, but we have at least the satisfaction that



FIG 119

Type of necrotic papillary carcinoma situated on lateral wall of bladder remote from ureteric orifice and amenable to segmental resection

the end has been rendered more tolerable and this in itself in my opinion fully justifies the adoption of such seemingly heroic measures

The retropubic method of carrying out the cystoprostatectomy differs little from that originally described by Hinman¹ in 1935. Most operators free the bladder from above downwards terminating the operation at the apex of the prostate. Hinman advocated the reverse procedure for many of these cases and I am in wholehearted agreement with his advocacy. I have to date performed 33 such operations with one death from intestinal obstruction due to the strangulation of a loop of small bowel through the sutures of the pelvic floor

¹ HINMAN F (1935) *Surg Gyn. Obst.* 60 684

THE OPERATION OF TOTAL CYSTO- PROSTATECTOMY

A urethral catheter is first passed, the bladder washed out and drained, the catheter being left in situ. A 4 inch suprapubic midline incision is now made, exposing the retropubic space routinely. The apex of the prostate is freed as already described in the operation for radical removal of the malignant prostate. Two ligatures are thrown around this region on an aneurism needle, the catheter withdrawn, and the ligatures tied firmly one cm apart. The urethra is sectioned between the ligatures. The proximal tissue is further secured by means of silk ligatures introduced through its substance on a trocar pointed needle. Traction is then maintained on the prostate by means of Littlewood's forceps, allowing sponging off from the underlying Denonvillier's fascia separating it from the rectum. When the area of attachment of the fascia to the seminal vesicles and vasa is reached it is incised, exposing these structures, and allowing for their freeing and delivery. The left vas and corresponding vessels are isolated, doubly clamped and ligatured. The opposite vas, etc., are correspondingly dealt with. The vascular pedicle of the bladder is next isolated on each side, doubly clamped en masse using curved Kocher forceps, and divided. The peritoneal cul de sac of the retrovesical fossa is now exposed and peeled off the bladder by gauze dissection until the urachal attachment is reached. If the peritoneum is firmly adherent to the dome of the bladder it is incised, and the adherent area removed with the bladder. The opening in the serous sac is sutured if it has been necessary to open it. Where a well-marked urachal attachment is present it is doubly clamped and divided.

Careful inspection of the pelvic cavity is now made to ensure that all bleeding has been controlled, and the area dusted with 5 grams of sulphanilamide. A corrugated drain is placed down to the severed membranous urethra, and the wound closed with interrupted sutures. The drain is shortened daily, and not removed before 5 days.

This operation ensures the removal of the entire bladder and the prostate and vesicles without opening and with a minimal handling of the invaded viscus. Particular care must be taken when eradicating a thin walled bladder containing a mass of friable papillary tumour lest perforation of the



FIG 129

Total cysto-prostatectomy specimen showing infiltrating papillary tumour of bladder with seedling tumours on base (patient alive and well six months later)

bladder occur and viable malignant cells be spilt into the pelvic cavity. Blood transfusions are administered when the hæmoglobin has sunk to below a safe level, either from pre-operative bleeding or unforeseen operative hæmorrhage. Post-operative rest in bed for 14 days is usually required.

Illustrative Case —

Mrs T æt. 54 complained of hæmaturia for one month little increased urinary frequency. Cystoscopic examination revealed extensive necrotic papillary neoplasm of left lateral wall of bladder hiding left ureteric orifice from view. Intra-

venous urograms showed normal right upper urinary tract but commencing dilatation of left ureter and renal pelvis

24 4 44 Bilateral uretero-intestinal transplantation

15 5 44 Total Cystectomy Large fungating papillary carcinoma

9 6 44 Discharged

Alive and well 2 years later

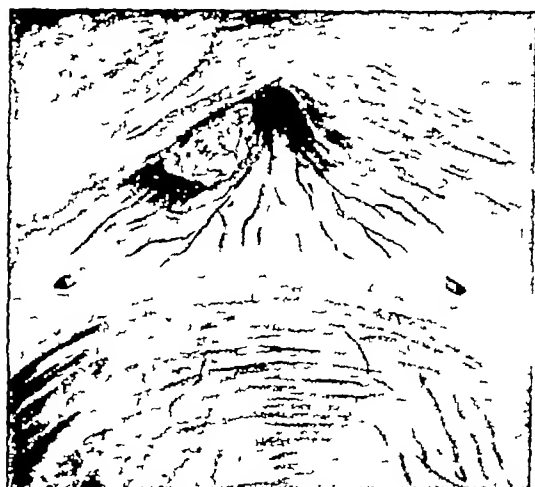


FIG 121

Papillary carcinoma of bladder neck

NEOPLASM OF THE VESICAL NECK

The vast majority of neoplasms of the bladder base, if operable, call for total cysto-prostatectomy preceded by ureteric transplantation. Those operations formerly employed, such as transvesical diathermic coagulation, were almost invariably followed by recurrence, as were the segmental resections. By means of the retropubic approach we have in one instance succeeded in removing with a wide margin a papillary carcinoma of the bladder neck, and preserving a completely continent bladder. In this case—a man of 57—a relatively early papillary tumour arising from the left side of the bladder neck was diagnosed cystoscopically. The classical retropubic exposure was effected, the prostate sectioned close to the apex and turned upwards, as already described under prostatic carcinoma. The anterior wall of the bladder, about 3 cms above the bladder neck, was incised transversely. The

papillary tumour was now visualised (Fig 121) and diathermic coagulation applied to the tumour. The trigone was incised transversely just below the ureteric orifices and the distal portion removed embracing the lower half of the trigone the bladder neck and the upper two-thirds of the prostate. The upper half of the trigone was mobilised and now approximated to the apex of the prostate as described under the radical operation for calculous prostatitis. The patient left hospital five weeks later soundly healed and with complete urinary continence. He was exhibited to the Surgical Unit of ¹¹³ Bartholomew's Hospital four months later symptom free and with full urinary continence.

In more extensive involvement, where it would be necessary to sacrifice the whole of the bladder base reimplantation of the ureters into the dome of the bladder would be necessary. This would present no difficulty and where an adequate amount of bladder could be left might be preferable to a uretero-intestinal transplantation. I would emphasise however that I regard a total cystectomy which avoids opening the bladder and so risking the spilling of malignant cells as the operation of choice in most cases of malignancy of the bladder base and neck.

CHAPTER XIX

POST-PROSTATECTOMY OBSTRUCTION

EVERY operation yet described for the relief of prostatic obstruction may be followed by recurrence of obstructive phenomena. During the past 17 years I have been called upon to deal with 83 cases of post-prostatectomy obstruction,



FIG. 122

Stricture at vesical outlet following Ireyer prostatectomy. View through Panendoscope with filiform approaching stenotic orifice.

excluding those following resection—strictures, inadequate resection, further growth of adenoma, etc. As mentioned earlier in the text five of these followed a retropubic prostatectomy by myself. Two other cases following this operation by other surgeons have recently been met with. All these cases occurred before the routine excision of a wedge

from the posterior lip of the vesical outlet was adopted. In more than 200 cases in which this was done no such complication has been met with



FIG 123

Stenosis of supramontine urethra following Harris prostatectomy. Urethroscopic view of stricture with verumontanum in foreground

The remaining 76 cases following various open operations for prostatic obstruction may be thus tabulated —

Original operation	
Freyer	42
Thomson Walker	4
Harris	10
Perineal	2
Unknown	18
	—
	76 cases

Excluding the two perineal cases where the obstruction recurred at the apex of the prostate and those due to incomplete removal of the adenomata the obstruction recurred

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at the vesical outlet In one case, a man of 86, a prostate weighing 135 grammes was removed retropubically ten years after a Freyer prostatectomy by a well-known Urological surgeon, he had in the interim undergone two transurethral resections In several other cases persistent obstruction had



FIG 124

Adenoma of right lateral lobe left behind inadvertently at Freyer enucleation, continuance of dysuric symptoms

been due to lobules left inadvertently close to the apex of the gland In a study of the subject some years ago and reported to the Section of Urology of the Royal Society of Medicine (printed in extenso in the *British Journal of Urology*, 1942) I suggested the following classification of post-prostatectomy obstruction —

- 1 Membrane formation —
 - a At the vesico-prostatic outlet
 - b At the membranous urethra
- 2 Scar Tissue formation —
 - a At vesical outlet (Fig 122)
 - b At lower end of prostatic cavity
 - c In the prostatic bed (Fig 123)



FIG 125

Typical Urethro-cystogram following successful Freyer prostatectomy three years previously



FIG 126

Oblique Urethro-cystogram showing shelf formation after Freyer prostatectomy ten months previously

3. "Adenomata" —

- a Inadvertently left behind at operation, varying in size from a whole lobe (most commonly a lateral lobe) to a small pea-like body (Fig. 124)



FIG 127

Oblique Urethro-cystogram three months after retropubic prostatectomy (No wedge resection was performed)
Symptom free

- b Late reformation of "adenomata" from prostatic tissue normally left at operation
- 4 Calculus formation either in bladder or prostatic cavity
- 5. Carcinomatous involvement of prostatic bed
- 6. Acute or chronic inflammatory lesions of the urethra, e.g., peri-urethral abscess leading to stricture

- 7 Stricture of the external urinary meatus usually the result of prolonged indwelling catheter drainage
- 8 Papillary tumour at vesical outlet or in the prostatic bed.



FIG. 123

Oblique Urethro-cystogram four months after retropubic prostatectomy in which wedge resection of posterior lip was effected. Symptom free

- 9 Carcinoma of the urethra
- 10 Psychogenic causes

Of the 53 cases described in my original paper I had recourse to open operation in only three with one additional seen in consultation and subsequently operated upon by another surgeon. Since this publication two additional cases

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have been subjected to open surgery, one by the classical transvesical route in 1941 and one by the retropubic approach in 1945. It is with this latter approach that I shall now deal.

Illustrative case.—

W H P, æt 73, six months previously a two-stage Freyer prostatectomy elsewhere, suprapubic fistula had never closed, very small amounts of urine passed per urethram with great



FIG 129

Oblique Urethrogram one month after retropubic enucleation of enormous 355 gram prostate. Note rapid shrinkage of prostatic cavity, continued elongation of prostatic urethra.

pain, no abnormality on rectal examination, general condition poor, impassable stricture in prostatic urethra.

10.9.45 Retropubic exploration, bougies passed along urethra and suprapubically through vesical outlet did not approximate, separated by diaphragm as in diagram (Fig. 130), longitudinal incision of anterior surface of prostate exposed this diaphragm which was then excised, catheter now passed readily from external urinary meatus into bladder, suprapubic fistula excised and closed in layers.

Obstruction following Retropubic Prostatectomy—With the newer technique outlined earlier I believe that this sequel should rarely if ever occur. Before the desirability of excising a wedge from the posterior lip of the vesical outlet was appreciated such cases were met with. The following is illustrative —

C H æt. 66 complained of urinary frequency and urgency for some years prostate only moderately enlarged on rectal examination cysto-urethroscopy revealed 75 c.cs. residuum, trabeculated bladder and obstruction due chiefly to sub-cervical lobe hypertrophy with moderate intraurethral lateral lobes.

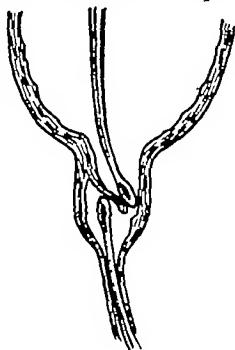


FIG 130

Diagram showing diaphragm formation in prostatic bed (antegrade and retrograde sounds in position)

27 11 45 **Retropubic Prostatectomy**

4 12.45 Catheter removed voided well without leakage

11 12 45 Discharged

22.12.45 Reported having difficult micturition, 11/14 steel gripped at bladder neck. Subsequent instrumentation confirmed progressive fibrosis at vesical outlet.

6.3 46 Endoscopic Resection of sclerotic bladder neck.

11.3 46 Discharged

20 6 46 Full urinary stream retaining urine 3½ hours by day no nocturia

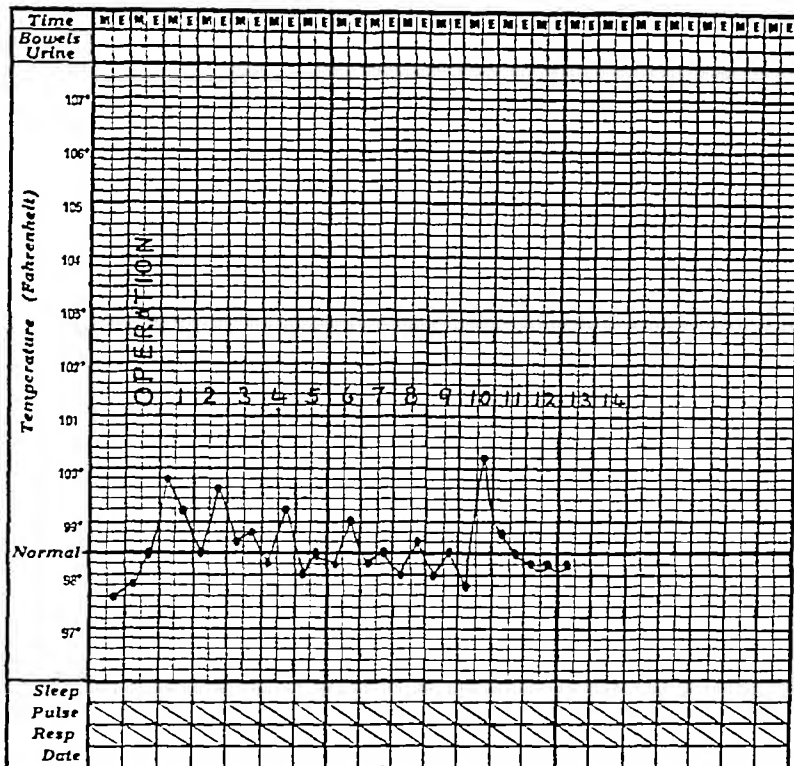


FIG 131
Temp Chart 1 (after retropubic prostatectomy)

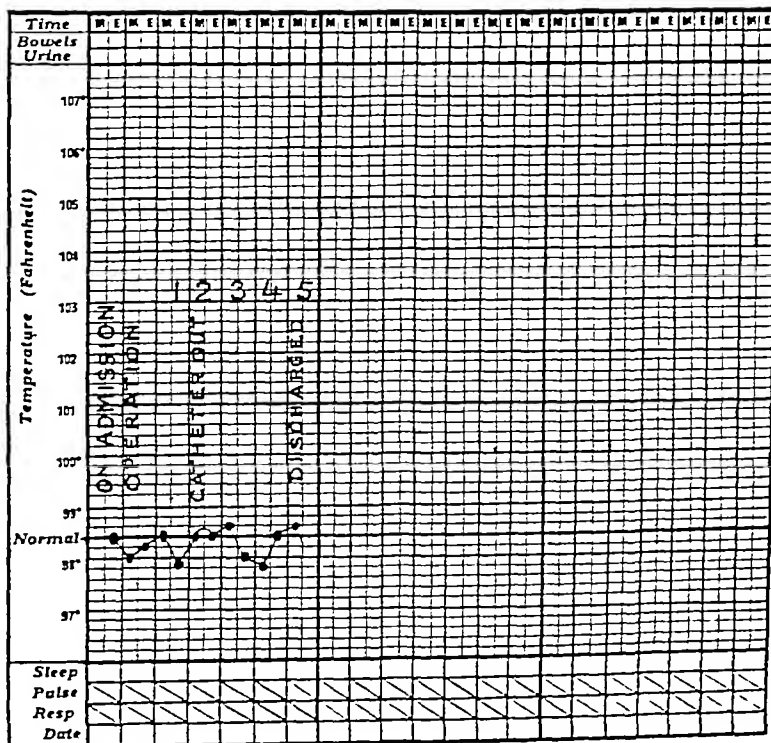


FIG 132
Temp Chart 2 (after subsequent endoscopic resection)

CHAPTER XX

TRAUMATIC RUPTURE OF THE POSTERIOR URETHRA

EXCLUDING those catastrophies where faulty instrumentation has led to the passage of a urethral sound bougie or catheter through the prostatic portion of the canal the commonest cause of rupture of the posterior urethra is violent trauma causing a concomitant fracture of the bony pelvis. It has been estimated that 5-10 per cent. of pelvic fractures and dislocations are associated with visceral complications¹. Those injuries causing a fracture of the pelvis associated with an avulsion of the apex of the prostate from the membranous urethra have long presented a real surgical problem. Urological opinion has been by no means unanimous as to the correct surgical attack. Nor indeed is diagnosis always easy. Inability to micturate following a severe pelvic injury associated with the appearance of blood at the external urinary meatus and the presence of a tender mass in the hypogastrium is suggestive of a severe lesion of the urinary tract above the urogenital diaphragm but it is only when a distended bladder can be palpated that certainty exists that a ruptured bladder is not present. A mobile prostate or soft mass precluding the palpation of the gland on rectal examination suggests rupture at the apex but suprapubic exploration is frequently necessary for accurate diagnosis as to the exact site of the lesion. French surgical opinion has long held the view that it is impracticable to attempt immediate repair of the damage owing to the presence of shock and to the great technical difficulties^{2,3}. An immediate suprapubic cystostomy is usually performed and some 6 weeks later an attempt made to re-canalise the urethra. English and American urological opinion has been contrary since World War I. Grey Turner⁴

1 WATKINS C P C (1920) *Brit J Surg* 17 22

2 LEPASTRE C STODOLSKY T (1934) Les ruptures de l'urètre

3 MICHAUX L (1924) *Ann Franc d'Urol*

4 TURNER G C (1923) *Lancet* 2 82

in 1923 laid down 4 principles for the treatment of the ruptured urethra :—

1. The urine must be deviated by suprapubic cystostomy.
2. The torn ends of the urethra must be approximated.
3. No indwelling catheter must be used
4. After union the channel must not be injured by the passage of large bougies.

With these views I am in entire agreement. It but remains to decide on the mode of application. Hamilton Bailey⁵ recommends ante- and retro-grade catheterisation, and replacement of the forwardly displaced prostatic urethra by threading into it an indwelling self-retaining catheter. He suggests that injuries of the posterior urethra represent the one exception to the rule that no indwelling catheter should be used, because here immediate suture is impracticable. Others, however, have used immediate suture with success, notably Morgan and Hunt,⁶ who carried out a combined operation, suprapubically and perineally, terminating with an exact end-to-end suturing from the perineal aspect. Hugh Young⁷ also achieved success with the perineal approach. The injury is an uncommon one, and Simpson-Smith⁸ was able to collect but 156 cases from the literature in 1936.

During the past year I have not met with a single case of such injury, but I am convinced after an extensive experience of the retropubic approach that an immediate suture of the urethra by this route is feasible. I would suggest the following technique :—After the initial shock has been warded off by means of the accepted restorative measures, the retropubic space should be opened up, blood clot evacuated, and the bladder carefully examined for evidence of concomitant vesical injury. A catheter would be passed along the urethra into the Cavum Retzii, so identifying the distal torn end of the urethra. The proximal torn end should be readily identified either by direct inspection and palpation, or by retrograde catheterisation after a preliminary cystostomy, and the catheter threaded

5 FAIRLEY HAMILTON (1944) *Emergency Surgery*

6 MORGAN C & HUNT A H (1942) *Lancet* 2, 330

7 YOUNG HUGH (1929) *J Urol* 21, 417

8 SIMPSON-SMITH A (1936) *Brit J Surg* 24, 309

through into the bladder. Using the boomerang needle the prostatic apex would be approximated by 3 or more sutures to the distal urethra avoiding the mucous membrane. The urethral catheter would then be withdrawn a de Pezzer supra



FIG 133

Attempted urethrogram showing deviation of urethra to right. Note marked comminution of pubis (Picture reversed)

pubic tube placed in the bladder the retropubic space drained routinely after a dusting with sulphanilamide powder. Experience with sub-total prostatectomy would indicate that this is readily feasible. The procedure would fulfil the canons laid down so excellently by Grey Turner for injuries in other parts of the urethra. At the conclusion of the operation reduction of the bony deformity in accordance with the principles laid down by Watson Jones' (lateral decubitus plaster fixation etc.) would be effected.

Late strictures of this portion of the urethra are amenable to repair by the retropubic route. The following case is instructive in this connection (Figs 133-136) —

D T 21 severe comminuted fracture of pelvis following

automobile accident, associated with rupture of urethra. After adequate anti-shock treatment, suprapubic cystostomy performed in military hospital on continent. Flown back to England ten days later. Urethral instrumentation attempted



FIG 134
Oblique urethrogram after perineal and subpubic mobilisation of bulbar and membranous urethra.

on several occasions without success. Transferred to Urological Centre. All attempts at urethral instrumentation under anaesthesia unsuccessful, complete block distal to membranous urethra. Rectal examination with bougie in position revealed marked deviation of urethra to right. Attempted Urethrogram (Fig 133) shows this deviation.

It was then decided to free the urethra from the pubic ramus perineally and subpubically. This mobilisation was effected by the double approach but it was still impossible to pass a bougie into the bladder owing to complete block in the prostatic urethra. Urethrography two weeks later showed a relatively normal distal urethra but marked contracture in the prostatic portion of the canal (Fig 134). Despite the presence of the suprapubic fistula, a retropubic exploration was then



FIG 135

Post-operative oblique urethrogram showing relatively normal contour



FIG 136

Post-operative antero-posterior urethrogram

made and the anterior wall of the prostatic urethra laid open until the tip of a bougie passed from the external meatus was identified. Much scar tissue in the prostatic portion of the canal was excised and a new canal fashioned. An indwelling catheter was maintained for 2 weeks and a silk thread from meatus to suprapubic fistula for a further 2 weeks to ensure easy weekly passage of bougies. No apparent re-contraction taking place the fistula was allowed to close. The patient has reported fortnightly at the Out-patient Department but no diminution in the calibre of the urinary stream has occurred and no urethral instruments have been passed since his discharge from hospital 4 months ago. Figs 135 and 136 show post-operative urethrograms.

CHAPTER XXI

PROSTATIC ABSCESS

IT has long been held and with this view I have concurred that the evacuation of the developed abscess of the prostate should be carried out in most cases through a perineal incision. From time to time cases will present themselves

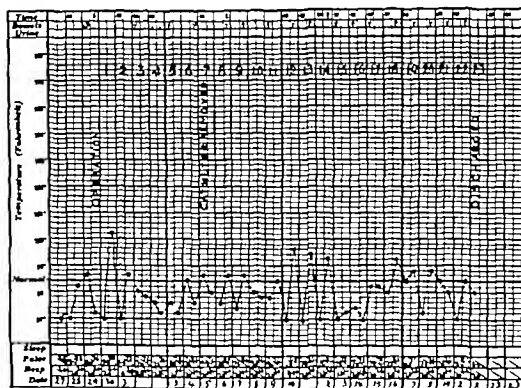


FIG. 137

where a transurethral evacuation is indicated using either a Collings knife through a panendoscope or one or other type of resectoscope. In general however it may be stated that a more complete procedure may be effected by an open operation permitting true saucerisation and the breaking down of all loculi. Since the introduction of the retropubic exposure of the prostate I have on three occasions employed this approach with great gratification. The operations have been simple and the post-operative courses uneventful. In no case has any

significant retropubic space infection developed. The first two cases left hospital on the fourteenth and sixteenth day respectively and I append herewith the case record of the third case who remained in hospital twenty-two days.

W.G., æt 55; attack of acute retention following perineal pain and difficulty; catheter tied in for five days, accompanied by intensive sulpha therapy; on withdrawal of catheter still inability to void; catheter replaced, seen in consultation, rectal examination revealed tender prostate, boggy; diagnosis of abscess; pyrexia had settled on sulpha therapy.

29.12.45. Retropubic exposure of prostate, with Tiemann catheter in situ; longitudinal incision of capsule; four ounces of pus evacuated; all loculi broken down; capsule sutured; routine closure and drainage.

5.1.46. Catheter removed; two hours later voided nine ounces of urine easily and without leakage.

21.1.46. Discharged soundly healed.

Bacteriological examination of pus revealed Staphylococci and Coliform Bacilli.

In two other cases where prolonged catheter drainage had been employed for retention due to adenomatous prostatic obstruction an abscess was found at operation. In each instance enucleation of the gland was effected and a routine post-operative course followed.

Here are the details of one of these cases —

W.W., æt 68; three weeks previously had an attack of coronary thrombosis followed by acute retention of urine, catheter passed and tied in; owing to shortage of hospital beds admission could not be secured for three weeks; investigation on entering hospital revealed a very large prostate on rectal examination; history of prostatic symptoms for more than six years.

27.9.45 Retropubic prostatectomy; on incising capsule an abscess was encountered, about $1\frac{1}{2}$ ounces of pus being evacuated; adenoma enucleated.

2.10.45. Catheter removed, voided without leakage.

18.10.45 Discharged soundly healed.

CHAPTER XXII

ANAESTHESIA

IN view of his age and frequently associated pathology—cardio-vascular pulmonary or renal—the prostatic patient is seldom an ideal one for anaesthesia and often considerable judgment is required as to choice of the agent. It is essential that the anaesthetic selected should be quickly eliminated with a minimum disturbance of metabolism. This object may be attained by various methods but skilful administration is in fact more important than the selection of the agent. For example chloroform may be less harmful to a patient when skilfully administered than nitrous oxide and oxygen imperfectly given by an inexperienced anaesthetist.

The majority of British patients prefer to be asleep during an operation so we resort to general anaesthesia unless most definitely contraindicated. The routine most commonly adopted is the following. As pre medication a hypodermic injection of Omnopon gr 1/3 and Scopolamine gr 1/150 is administered one hour before operation. This secures in most cases a drowsiness and amnesia to subsequent events. (This dosage is varied according to the age and general condition of the patient, and in the very aged the sole premedication employed is Atropine gr 1/150.)

For induction four to seven ccs of a five per cent. solution of pentothal sodium is given intravenously in the anaesthetic room and the patient transferred to the operating table. Anaesthesia is then continued with nitrous oxide and oxygen care being taken to avoid cyanosis high positive pressure or accumulation of CO₂ in excess. A machine equipped with a CO₂ absorber is recommended for this purpose. When deeper anaesthesia is required for example during enucleation of the prostate further injections are given of two or three ccs of the pentothal sodium solution as indicated. An arm rest ensures access to a suitable vein. It may be emphasised

that in this technique pentothal sodium is the main anæsthetic agent. While acting as an adjuvant, or synergist, the mixture of nitrous oxide and oxygen counteracts the respiratory depression which pentothal sodium is liable to cause when given alone—an important point in the prevention of post-operative pulmonary complications. It is advisable, however, to limit the total amount of pentothal sodium used to gm 1. Should this amount prove insufficient, as sometimes happens in patients who are abnormally resistant to the action of barbiturates, it is preferable to obtain the necessary depth of anæsthesia with cyclo-propane or ether, or by judicious addition of chloroform when diathermy is in use at the site of operation.

Local Analgesia.—If for any reason general anæsthesia is contra-indicated, for example in the very old, in the presence of high blood urea or of advanced cardiac disease, operation can be carried out satisfactorily by a limited field block with 1 per cent novocain, further injections being made into the rectus sheath, the space of Retzius, and the prostatic capsule, when it is exposed. This procedure gives results equal to caudal and trans-sacral block and requires less time.

Spinal Analgesia.—Spinal analgesia, we feel, need be considered only in the special circumstances in which an expert anæsthetist is not available, and the surgeon is called upon to make the injection himself. The method provides adequate facilities for the surgeon. Apart, however, from the occasional complications associated with it, such as a dangerous fall in blood pressure, post-operative headache, or abdominal distention, a great disadvantage appears to be the detrusor weakness present for some hours, with absence of “vis a tergo” to keep the bladder empty and so minimise the tendency to clot formation.

Post-operative Care.—In the immediate post-operative period before consciousness is fully regained, even when cyanosis is absent, the administration of oxygen is often beneficial, particularly when the patient is old or a bad risk. Later, when the patient is able to co-operate, he should be

encouraged to breathe deeply and thus help to prevent stagnation at the pulmonary bases

We have no doubt that the retropubic operation can be performed with considerably less anæsthetic agent than any other open prostatectomy with which we are acquainted

I W MAGILL

the procedure I am about to describe the fascial sling is attached at each extremity to a muscular support and by relaxing the abdominal wall a degree of laxity is obtained. This condition is fulfilled in the position commonly adopted

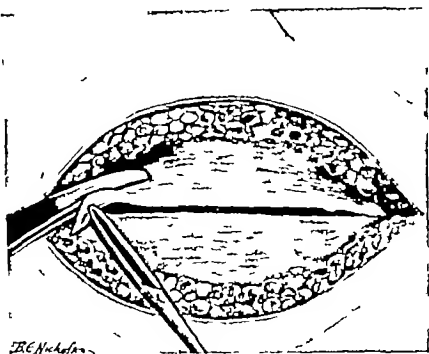


FIG 138

Shows transverse incision in aponeurosis Fashioning
of first fascial strap

during the act of micturition. Moreover those very acts—coughing sneezing etc.—which by raising the intra-abdominal pressure lead to an escape of urine in such cases, following the operation cause a tautening of the fascial sling elevating the bladder neck and so minimising the likelihood of a urinary loss.

THE OPERATION

A 15F rubber Malecot catheter is introduced on a stilet along the urethra into the bladder which is duly emptied. A flexible stilet is then placed within the catheter to render its identification easier at a later stage of the operation. The vagina is packed with gauze soaked in 1/1000 Flavine.

A transverse incision 15 cms in length is made about three

fingers' breadth above the pubis. This is deepened through subcutaneous tissue and each flap undermined, being sponged from the underlying aponeurosis. Whilst each flap is retracted by means of a pair of Lane's forceps, fascial strips one cm

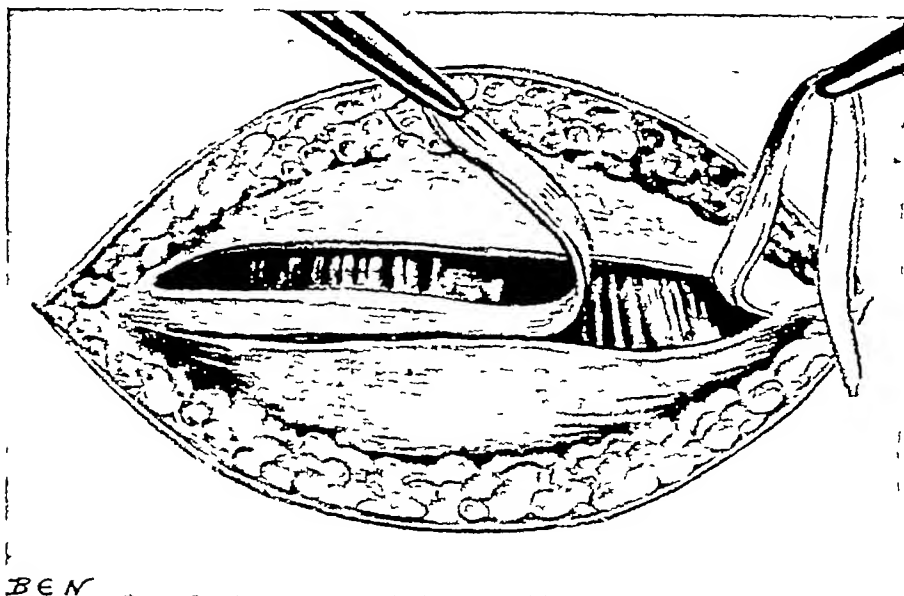


FIG 139

Shows two fascial straps cut and ready to be laid aside in warm saline swabs

wide are cut from the aponeurosis as shown in Figs 138, 139 and 140. Each strip is wrapped in a warm saline swab. The Recti muscles are now separated in the midline close to the pubis and with a sweep of the right index finger the retropubic fatty tissue is drawn upwards along with the peritoneal fold. The author's self-retaining retractor (Fig 47) is now inserted, spreading the Recti. Careful inspection of the retropubic space is now made, identifying the deep dorsal vein of the clitoris. It is frequently desirable to section this between hæmostats and seal with the diathermy point. The urethra with its contained catheter is palpated and the bladder neck identified by its proximity to the expanded end of the Malecot. Using a small swab on long sponge-holding forceps, and supporting the urethra between the index finger and thumb of the other hand, it is cleared on either side and as far as



FIG 140
Operation photograph
(Court y Dr I J)

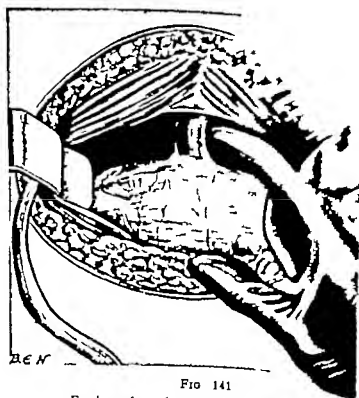


FIG 141
Freeing of urethra from underlying

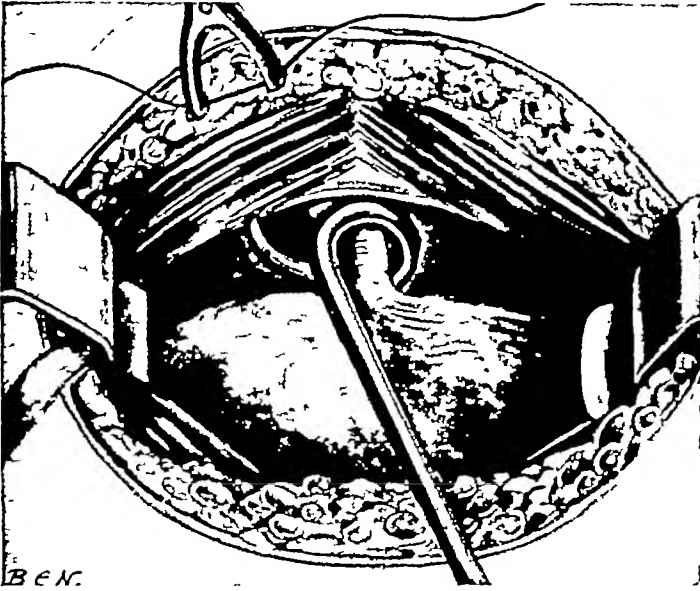


FIG 142

Stripper passed below urethra and ready for application of silk ligature

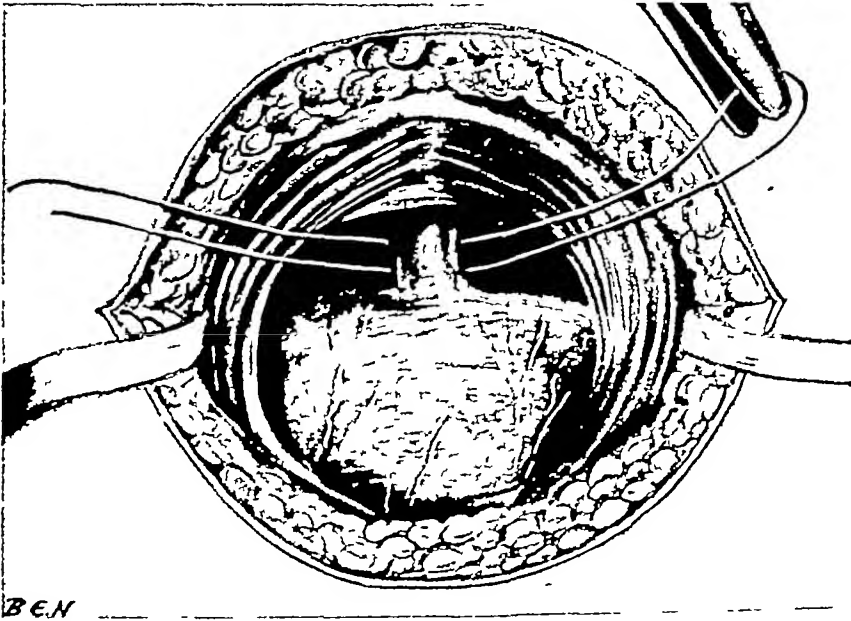


FIG 143

Cutting of silk after its passage through tunnel

possible from the underlying packed vagina (Fig 141) As the operation is usually conducted after one or more vaginal interventions there are usually dense adhesions between the upper urethra and vagina and complete freeing is impossible

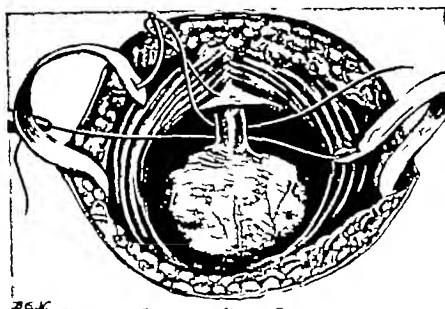


FIG 144

Fixation of silk suture to ends of fascial strips

Still supporting the upper urethra between the index finger and thumb of the left hand an aneurysm needle or better the modified Doyen rib stripper is forced through between the vagina and urethra. Gentle up and down movement will enlarge the tunnel sufficiently to permit a free passage of the fascial slings at a later stage. (Fig 142.)

A two-foot length of No 2 silk held about its mid point in a Harris ligature carrier (Fig 50) is threaded on to the stripper and thus drawn through (Fig 142)

The ligature is cut at its mid point with scissors (Fig 142) A free end of each ligature is now securely fastened to the extremity of each fascial strip as shown in Fig 143

By drawing on the silk threads each strip is drawn through the tunnel below the bladder neck. (Fig 144)

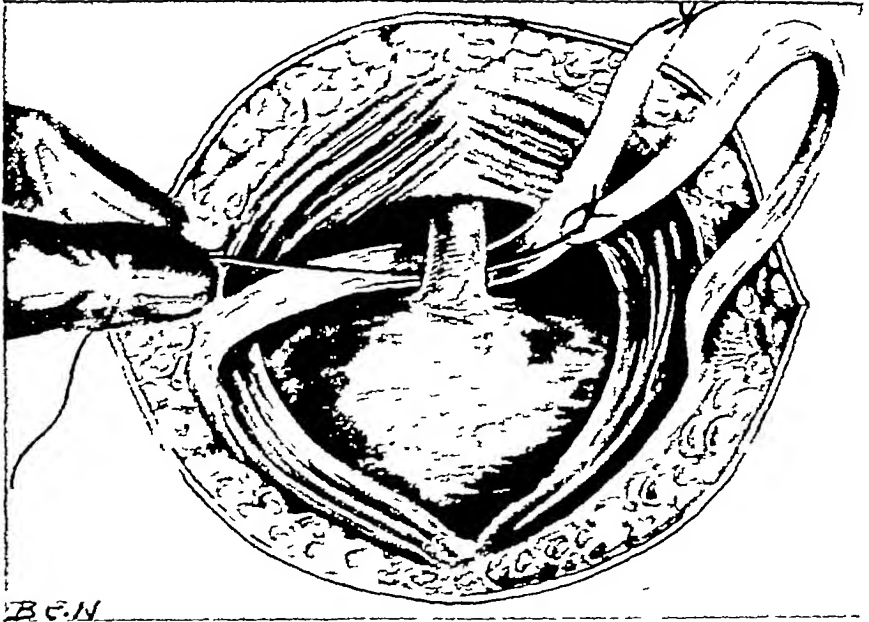


FIG 145

Drawing of second strap through tunnel The first strap has already been drawn through

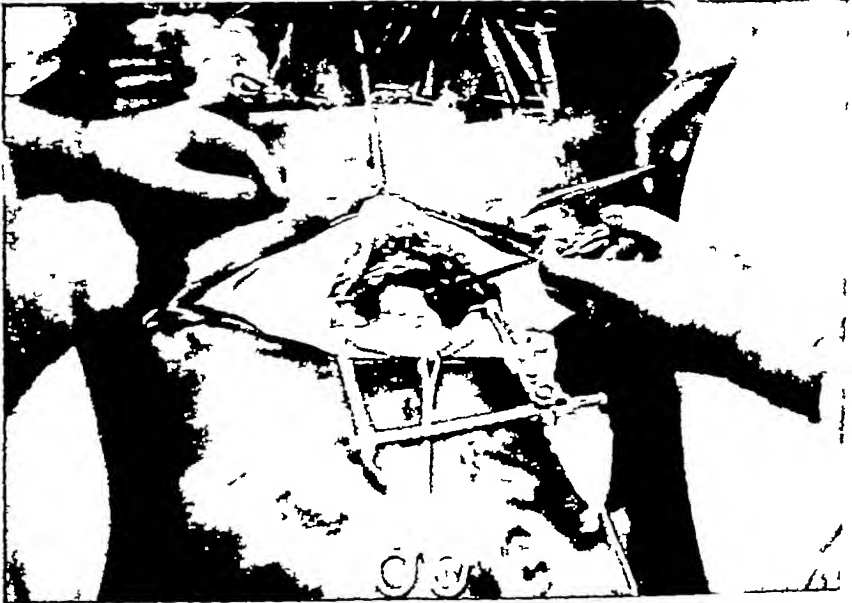


FIG 146

Operation photograph showing strap being drawn through suburethral tunnel

(Courtesy Dr L J Quinn)

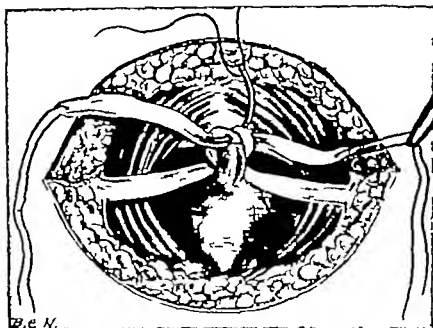


FIG 147

Fixing fascial knot about urethra.

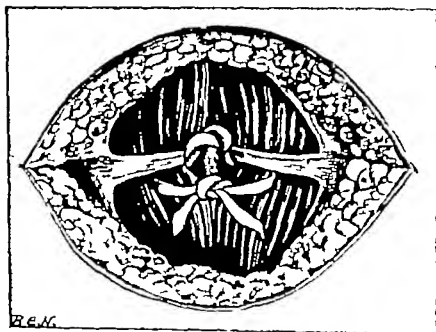


FIG 148

Final knotting

The straps are knotted together singly and the knot secured with a catgut stitch as shown in Fig. 146

The free ends of the straps are now drawn through the

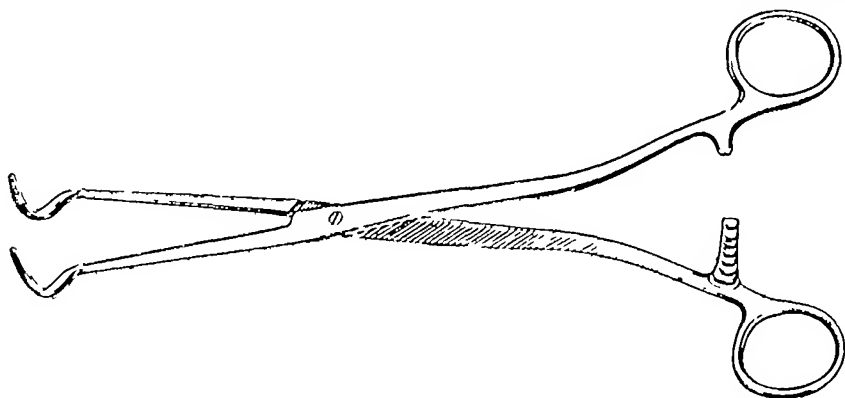


FIG. 149

Pincer forceps for drawing fascial straps through tunnel

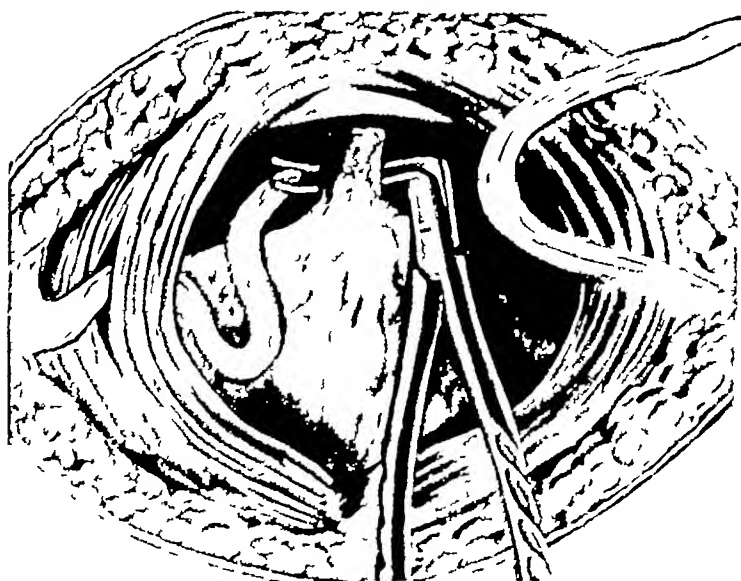


FIG. 150

Shows use of special forceps for drawing straps under upper urethra to elevate bladder neck

middle of each Rectus muscle and secured together by a knot transfixed with catgut. (Fig. 147.)

This manoeuvre serves a dual purpose, (a) it supports the fascial sling to muscle at its inner end and (b) it approximates the Recti. The transverse hiatus in the abdominal aponeurosis is now closed with interrupted catgut sutures after a small

ated drain has been placed into the retropubic space
ng a dusting with Sulphanilamide powder The skin
d Sulphathiazole is administered orally in small doses
inary antiseptic for five days

e catheter is gently irrigated with normal saline after
xible stilet has been withdrawn to ensure that it will
correctly Some readjustment in its position may be
ed The vaginal pack is removed

ave performed this operation in over 60 cases during
st three years with the most gratifying results

ne modifications of the above technique are now
ed At the suggestion of Mr Charles Read F.R.C.S.
cial straps are directed to the bladder neck through the
orders of the Recti and not between the muscles This
a useful additional length for the final knotting I have
lso abandoned the use of silk for drawing the straps
h the tunnel between vagina and urethra but employ
ired instruments shown in Figs 149 and 150 and draw
aps through directly

re must be taken not to elevate the bladder neck unduly
oar obstruction occur It is my present practice in most
to suture the straps to each other with Nylon on each
f the urethra The free ends of the straps are thus not
rought anterior to the recti muscles

APPENDIX I

50 consecutive cases of One-stage Retropubic Prostatectomy (excluding two deaths) to illustrate functional results

Case	Name	Age	Pre-Operative State	Pic Operative Treatment	Blood Urea	Post Op Days in Hospital	Symptoms 2 Months Post Operatively	Symptoms 4 Months Post Operatively	Remarks
1	J McL	60	Acute retention F 16 5	Catheter 3 days	64	19	S + F normal/0	S + F normal/0 1	
2	H S	74	Acute retention	Catheter 6 days	36	31	S + F normal/1 2	S + F normal/1	Diabetic Post operative leakage, detained
3	C W W	59	F 1 2 hourly/1 D + S poor	—	34	28	S + F normal/0 1	S + F normal/1	Detained for slight diurnal incontinence
4	H O	70	F 16/6 S v poor	Catheter 7 days	27	15	S + F normal/1	S + F normal/1	
5	H N	74	Chronic retention F 10/3 S v poor	Catheter 10 days	28	27	S + F 2 hourly/1 2	S + F normal/1-2	
6	A L	77	F + + /3 4 S v poor	—	48	22	—	S = + F = normal/1-2	
7	F W	63	Acute retention	Catheter 7 days	51	17	—	S + F normal/1-2	
8	Dr W L	60	F 2 hourly/3 S poor	—	38	16	—	S + F normal/1 2	
9	J C	71	F hourly/2 5 S v poor	—	30	12	—	S + F normal/1	
10	L B	71	Acute retention	Catheter 2 days	26	43	—	S + F normal/2 3	Detained for haematemesis from old gastric ulcer

Case	Name	Age	Pre Operative State.	Pre-Operative Treatment	Blood Urea.	Post-Op Days in Hospital	Symptoms 2 Months Post-Operatively.	Symptoms 3 Months Post-Operatively.	Remarks
11	H B N	64	P 2 hourly/3-3 S poor	—	42	14	S + P normal/1	S + P normal/1	
12	J H. A	69	P normal/2-3 S poor II	—	42	13	S + P normal/1	S + P normal/1	
13	A W O	66	P normal/3 S & poor	—	36	16	S + P normal/1	S + P normal/1	
14	I B	7	P + +/2-5 S poor	—	41	12	S + P normal/1 2	S + P normal/1	
15	H N	68	P hourly/4 S poor	—	40	13	S + P normal/1	S + P normal/0 1	
16	A L.	63	Sev attacks retention P 2 hourly/2-5	—	44	1-	—	S + P normal/1 *	
17	Dr H B	76	P + +/2 D + S poor	—	43	14	S + P normal/1	S + P normal/0 1	
18	H B	73	Cerebral thrombosis Act to retention	Catheter 4 days	47	10	—	S + P normal/1 2	
19	A M P	58	Chronic retention Ureteric	Catheter 14 days	63 72	22	S + P normal/0	S + P normal/0	Suprapubic leakage Obturator neuritis
20	D O	71	Acute retention	Catheter 2 days	41	14	—	S + P normal/0-1	
21	J M	65	Cerebral thrombosis (1941) Chronic retention	Catheter 5 days	38	16	S + P normal/1	—	Died from cerebral thrombosis * 1 month later

RETROPUBLIC URINARY SURGERY

Case	Name	Age	Pre Operative State	Pre Operative Treatment	Blood Urea	Post Op Days in Hospital	Symptoms 2 Months Post Operatively	Symptoms 4 Months Post Operatively	Remarks
22	A L	82	Chronic retention	Catheter 20 days	58	11	S + F normal/1	—	Died from coronary thrombosis 3/12 later
23	S W H	66	F + + / 1 S poor	—	43	11	S + F 2 hourly/2 Slt incontinence	S + F 3 hourly/1 2 U sts	
24	E M	57	F + + / 2 S poor	—	39	15	—	S + F normal/1	
25	T McD	68	Acute retention	Catheter 2 days	47	15	S + F normal/1	S + F normal/0 1	
26	F W C	70	F + / 6 S poor	—	41	21	S + F normal/1	S + F normal/1	
27	A W K	61	F + + / 3 4 S poor	—	44	14	S + F normal/2	S + F normal/1	
28	Dr R S	66	Sev attacks of retention	—	43	16	—	S + F normal/1 2	
29	C R M	63	F normal/1 S v poor	—	41	17	S fur F normal/1 2	S + F normal/1	Bougies passed at 2/12 and 3/12
30	R N	69	F v aures/1 U + +	—	42	16	S + F normal/1	S + F normal/1	
31	E G	68	F + + / 3 4 S = poor	—	39	14	S + F normal/1 2	S + F = normal/0 1	
32	J M	61	Acute retention	Catheter 5 days	34	15	S + F normal/0	S + F normal/1	
33	R S H	55							

Case.	Name.	Age.	Intra-Operative State	Pre-Operative Treatment	Blood U on Hospital	Post-Op Days in Hospital	Symptom 2 1/2 mths Post-Operatively	Symptoms 4 Months Post-Operatively	Remarks
21	T B.	65	P - hourly/4 S poor	—	33	8	S + P 1 1/2 hourly/3-4	S + P normal/0	Suprapubic leakage catheter replaced
22	R H.	54	P - hourly/fine S poor	—	34	15	S + P normal/1	S + P normal/0 1	
23	C L.	0	P - hourly/4 U + P illingling	Digitalis	47	13	S + P normal/3	S + P normal/	
27	L. F.	68	Acute retention	Catheter 0 days	30	14	S + P normal/1	S + P normal/1	
28	W W.	50	P 1 1/2 hourly/2 U +	—	35	17	S + P normal/1	S + P normal/1	
30	P H.	51	P - hourly/3-4 S poor	—	40	14	S + P normal/1	S + P normal/0	
40	H B L.	70	Acute retention	Catheter 0 days	45	37	—	S + P normal/3	Detained for per sistent incontin- ence which cleared completely
41	B J T.	60	P - hourly/fine S poor	—	—	14	S + P normal/1	S + P normal/1	
42	D I C.	54	P 2 hourly/- U +	—	37	1	—	S + P normal/0	
43	J M.	60	P 2 hourly/3 S poor	—	11	0	—	S + P 3 hourly/3	Slight incontinence perineals
44	D W L.	60	P - hourly/3 S poor	—	38	20	—	S + P normal/1 2	

Case	Name	Age	Pre Operative State	Pre Operative Treatment	Blood Urea	Post-Op Days in Hospital	Symptoms 2 Months Post-Operatively	Symptoms 4 Months Post-Operatively	Remarks
45	T E S	81	Overflow retention	Catheter 10 days	50	20	—	S + F 2-3 hourly/ uses bottle	Marked senile degeneration
46	G F T	75	Chronic retention with overflow	Catheter 8 days	51	19	—	S = + F = normal/1-2	
47	H W	61	Acute retention	Catheter 9 days	41	15	—	S + F normal/0-1	
48	C B	70	Acute retention	Catheter 6 days	42	16	S + F normal/0-1	S + F normal/0-1	
49	Rev J T	60	F 10 1 2 U +	—	36	16	S + F normal/1	S + F normal/0	
50	F B	51	F 2 hourly 3 4 S poor	—	26	14	S + F normal/2	S + F normal/0-1	

APPENDIX II

I am indebted to my friend Dr Fernand Stobbaerts, of Brussels for two most interesting contributions. In the first he refers to a case which came under his care some 10 years ago in which he actually carried out successfully a repair of a ruptured urethra by the retropubic approach using a method similar to that I have indicated on page 174 though he secured access by removing some loose bony fragments in the course of the operation, a procedure which may be now considered unnecessary

TRAUMATIC RUPTURE OF THE POSTERIOR URETHRA



FIG 181

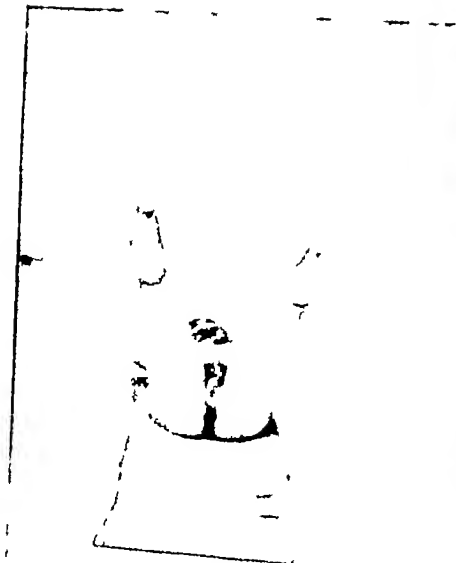
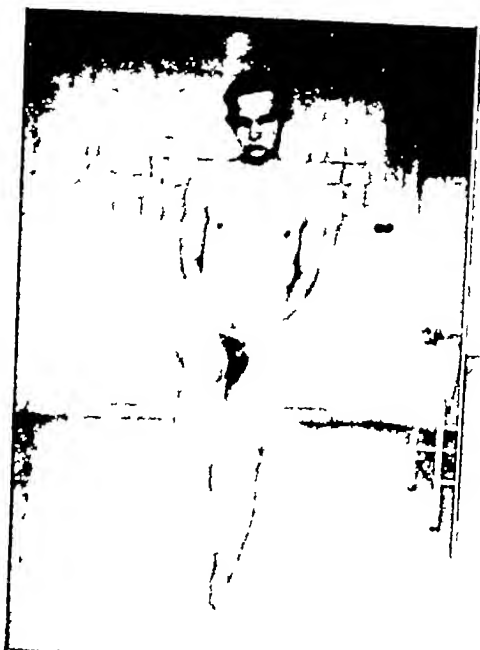
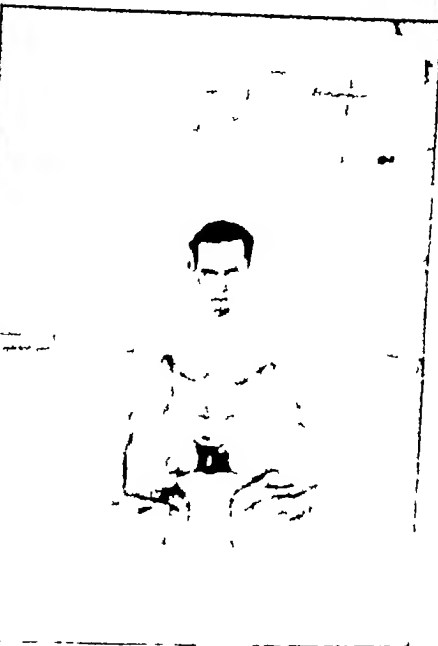
The patient was a miner who in 1935 was crushed between two waggons. He was brought to the surface and immediately taken to hospital being examined within an hour of the accident. He was extremely shocked with a rapid pulse of poor volume peritonism and copious hæmorrhage



FIG 153



FIG 154

Fig
155Fig
156Fig
157Fig
158

FIGS 155, 156, 157, 158

Post operative photographs of above case

carried out under complete visual control. The distal fragment of urethra was mobilised and directed into contact with the proximal or prostatic portion. On the end of the sound was fastened a long Nelaton catheter. The approximated fragments were sutured together by linen thread and to avoid tension reinforcing sutures were placed on each side and on the anterior surface of the newly constituted urethra. This part of the operation was carried out under visual control without any particular difficulty. At the end of three weeks the urethral catheter was removed, the bladder filled with antiseptic fluid through the cystostomy tube. It was then corked and the patient requested to micturate. The skiagram showed completely the success of the operation (Fig. 154). The subsequent treatment consisted of periodic urethral dilatations. Three months later the patient was seen again. Micturition was easy, a No. 40 Benique sound passed easily and as the photographs show there was no apparent disability from the loss of bone. He subsequently took up his work again as a miner. He reported every three months for the first year the urethral calibre being maintained at 40 Benique. The patient has been seen recently almost 10 years after his accident and the satisfactory result has been maintained and curiously enough palpation of the pubic region shows an apparent reformation of the bony skeleton.

CONTRAST DESCENDING URETHROGRAPHY

At the French Urological Congress in Paris 1946 Dr Stobbaerts described his original technique for Radiological Delineation of the Cavity after Prostatectomy, and showed its application in a case on which I had performed a retropubic prostatectomy three months previously in Brussels at the Belgian Urological Congress by courtesy of Professor van den Branden. By means of a fine precipitate of Thorium the lining of the bladder and urethra are visualised on the film as they are dilated by air passed out by the patient during micturition. The technique is as follows —

A catheter is passed and the bladder washed out with

3 per cent Sodium Chloride solution to remove all mucus
50-100 cc of Thorium Dioxide is injected, followed by
sufficient air to cause the patient to feel that the bladder is

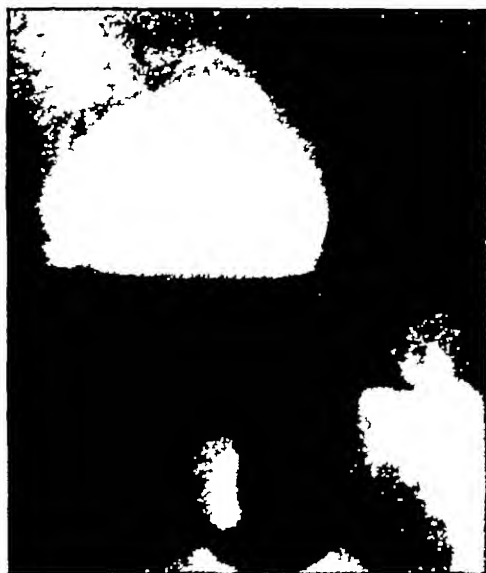


FIG 159



FIG 160



FIG 161



FIG 162

full The first film is taken with the patient standing in the
oblique position with the bladder full He is then instructed
to urinate, a second film being taken during the passage of
the Thorium, and a third during the passage of the air

Fig 159 shows a normal micturition cysto-urethrogram made by the above method. In Fig 160 is shown a case three months after retropubic prostatectomy taken before micturition the bladder containing air above and Thorium below. Fig 161 shows the beginning of micturition the Thorium solution passing through the prostatic cavity and into the



FIG 163

urethra. In Fig 162 the Thorium has passed through leaving the urethra outlined as the air is passed out. Fig 163 is of another case following a suprapubic prostatectomy showing how distinctly the urethra can be outlined by this method.

From a study of post-prostatectomy cases—Freyer retropubic, and transurethral—Dr Stobbaerts makes the following deduction — It seems then that the operation of Millin in spite of the section of the bladder neck which he carries out routinely is one that is less mutilating from the physiological point of view than the Freyer the sphincteric mechanism being entirely preserved the adenoma alone being removed. He has noted also as have we that these cases have frequently an external ejaculation of semen.

EPISPADIAS

I have on two occasions employed the retropubic approach to expose the bladder neck and prostatic portion of the urethra in such abnormalities. In each case an excellent exposure was obtained, the verumontanum being clearly seen. It was not a difficult matter to excise a wedge from the anterior aspect of the bladder neck and upper urethra, and suture snugly about a small catheter. Complete continence has been secured. I hope to be able to publish the end results of these cases at a later date, but experience so far suggests that the route will enable us to deal satisfactorily with this most difficult type of case.

CONGENITAL VALVES OF THE PROSTATIC URETHRA

Since the introduction of the retropubic approach I have not met with a case of this abnormality. My friend, Mr. Bagot Walters of Lincoln, tells me that he has been able to excise satisfactorily such valves after a retropubic exposure of the dilated posterior urethra. It would appear to be the ideal approach, and can be carried out either after or at the same time as the suprapubic cystostomy.

